

modern machine shop

MAY 1961



**TOOL SHOW
ISSUE**

The MAGAZINE for PRODUCTION EXECUTIVES in METALWORKING PLANTS



"This Bokum recess tool and holder increased our production by 608%"

"The Bokumatic Model B-1 tool holder and recessing cutter lets us cut 4-7/16" diameter snap ring retaining grooves in passenger car mirrors at the rate of 425 per hour as compared to the 60 we would have gotten on a lathe setup," says M. M. Andrews, president, Mutual Plating and Die Casting Co., Detroit, Michigan. This is typical of the way in which the standard Bokumatic tool holder can be adapted to meet special requirements. For complete information write for a free copy of the BO-1-60 catalog.

BOKUM TOOL COMPANY, INC.



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Just as you ordered, Sir!



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Special bushing short orders! All sizes, shapes, types, quantities. American's staff of experienced engineers is ever ready to give help on any special bushing problem. In addition to start-from-scratch designs we stock complete inventories of semi-finished bushings. They are ready to be ground to order and shipped pronto. And American's complete manufacturing facilities assure absolute guaranteed precision on every bushing delivered. It's no accident that American is the world's largest producer of drill jig bushings, both standard and special. Above is an entree of specials we have served customers in the past. What will YOUR order be?

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modern machine shop

For Production Executives

Vol. 33, No. 12, May, 1961

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A STATEMENT OF POLICY—The principal function of MODERN MACHINE SHOP is to search out and disseminate the best and newest ideas for advancement of engineering skill and mechanical efficiency in the metalworking industry and neither effort nor expense is spared in the performance of this task.

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page

► **116 HOGGING—A JOB SHOP SPECIALTY**

By Gilbert C. Close

At the H. A. Seele Corporation, Los Angeles, California, heavy bars, forgings, and rough castings that would defy handling in many shops are reduced to easily workable dimensions and made ready for the final operations that will transform them into critical, closely-dimensioned finished parts.

► **122 HIGH SPEED MACHINING—THE ANSWER TO LOW COST PRODUCTION OF NON-FERROUS METAL PARTS**

Based on information presented at a conference held recently at the Onsrud Machine Works, Inc., Niles, Ill., this article contains question and answer type data regarding high speed methods of machining a variety of products.

► **126 WHAT CONSTITUTES A GOOD POWER PRESS SAFETY PROGRAM?**

By J. H. Greenough

Safety for the press, operator and those who service the equipment must be engineered into the equipment, according to the author of this article, who is plant manager of the Chevrolet-Indianapolis Division of General Motors Corporation. Information is based on a paper presented at recent National Safety Congress.



► **134 SIMPLE DIE FORMS BEADED CHANNEL**

By L. Kasper

This article illustrates and describes a die which is designed to form a blank into a channel shape with beads on two sides.

in this issue

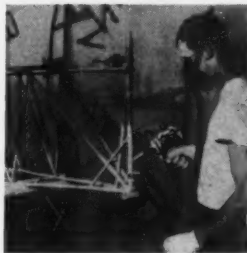
page

▶ 140 **FASTER MACHINING STAINLESS DEVELOPED BY UNIVERSAL-CYCLOPS**

Few developments of new materials in recent years have attracted as much attention as the new free machining chromium-nickel stainless steel, designated Uniloy 303 MA, which was recently announced as being commercially available by Universal-Cyclops Steel Corporation, Bridgeville, Pennsylvania.

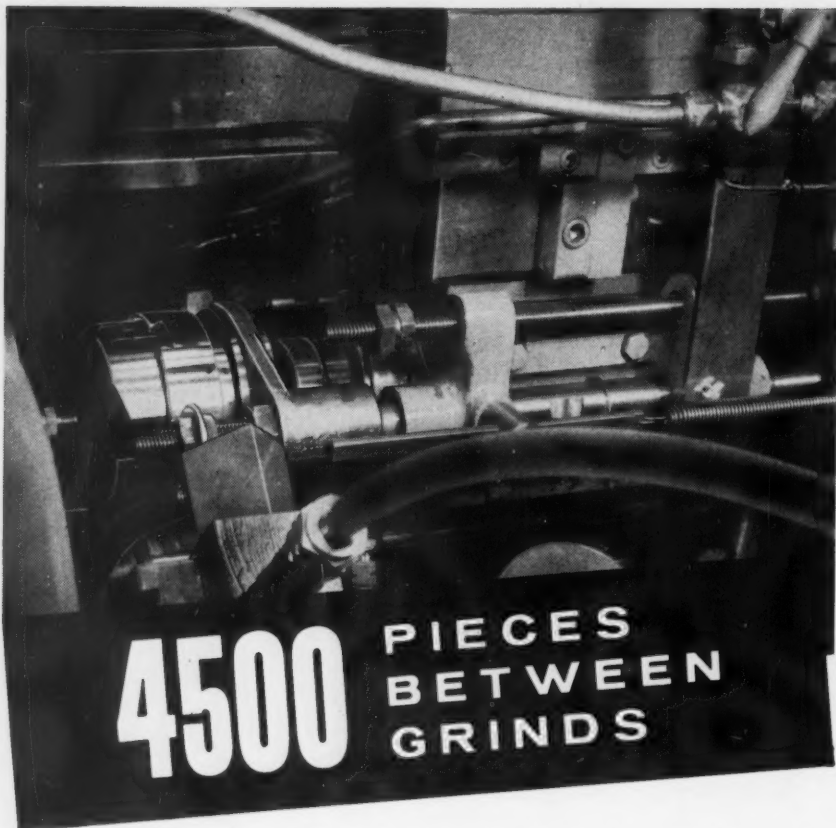
▶ 144 **MORE PRODUCTION THROUGH MODERNIZATION**

Several methods for cutting costs and increasing production are illustrated and discussed including a milling machine setup for duplicating a drop forge die; a versatile setup for increasing pillow-block production; a vertical miller setup for repairing and rebuilding compressors; an economical armor-plate turning method; an automated motor shell manufacturing installation; a method for corrosion-proofing plane components; a special drilling setup for aluminum window frames; and a shot blasting method which is designed especially for reducing brazed cutting tool cleaning time to a minimum.



▶ 184 **ASTME CONFERENCE AND EXPOSITION**

This section covers in detail the American Society of Tool and Manufacturing Engineers' Engineering Conference and Exposition, which is to be held in New York City from May 22 through 26. In addition to general information regarding the "Tool Show", this section presents the complete program of technical sessions which will be held concurrently with the show; data on a surface metrology seminar, techtours, symposium, plant tours, special events and ladies activities; and a schematic drawing of the Coliseum where the exposition will be held, as well as a complete list of exhibitors. Moreover, there are illustrations and descriptions of tools, machines and materials that will be displayed.



... threading stainless steel on bar automatic

A LANDEX Hardened and Ground Die Head has maintained exceptional chaser life threading male connector tube fittings at the Crawford Fitting Co., Cleveland, Ohio. 4500 ($\frac{1}{16}$ " 20 pitch UNF $\frac{5}{16}$ " long) threads were cut to Class 3 fit on 316 stainless steel between chaser grinds. Let us show you how to improve threading operations—send specifications and ask for Bulletin F-80.

504

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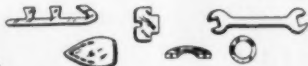
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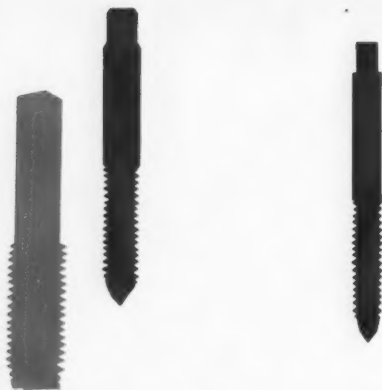


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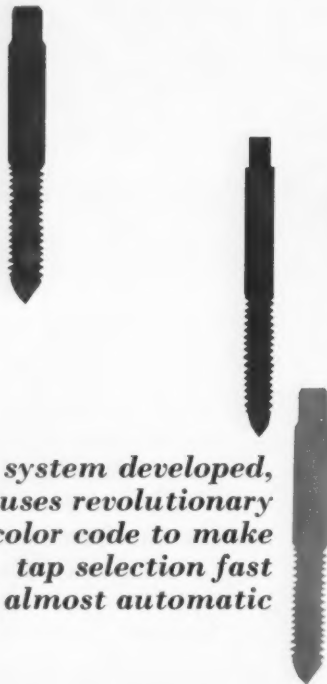
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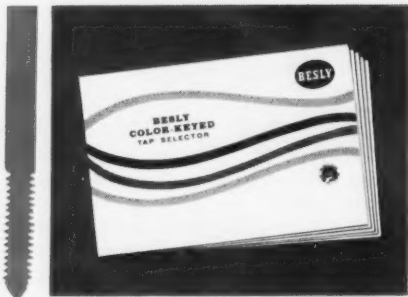
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*New system developed,
uses revolutionary
color code to make
tap selection fast
and almost automatic*

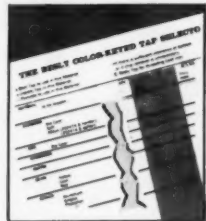


■ It's been a long time in coming, but it looks like it's here. An easy, almost totally fool-proof way to make your tap selections has been developed by Besly-Welles. The right tap—for 75% of all requirements—can be selected in little more than *seconds!*

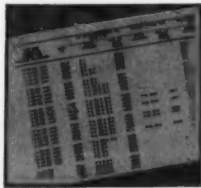
KNOW THE MATERIAL AND FOUR COLORS.
This revolutionary Besly idea doesn't

require that you have any special knowledge. The facts you need are just two: (1) know the material to be tapped and (2) four basic colors. With just that information and the Besly-Welles Tap Selector you can make most tap selections almost automatically and without mistake.

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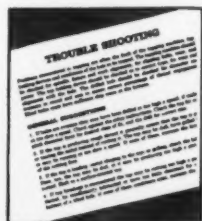


FIND EXACT TAP IN COLOR-CODED SELECTOR. The exact size, pitch, pitch diameter tolerance and catalog number are right at your fingertips. All the details are in the BESLY-WELLES Tap Selector book. And it's color-coded, too, so there's no chance of confusion. The chart tells you



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For a *free* copy of the Besly-Welles Tap Selector—write today.

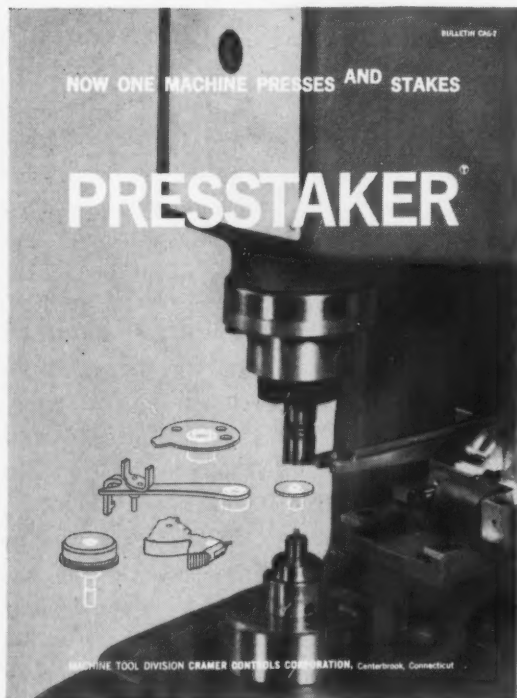


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120 DEARBORN • SOUTH BELOIT, ILL.

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PRESSTAKER pays for itself in **days** by (1) cutting labor costs, (2) eliminating subassembly inventories, (3) reducing capital equipment costs, (4) saving space, (5) reducing design limitations and (6) eliminating human error. Send for free bulletin today and learn why.

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Published Tolerances

Longitudinal Travel:	
Greatest error in any inch	30 millionths
Greatest error in 18 inches	90 millionths
Cross Travel:	
Greatest error in any inch	30 millionths
Greatest error in 11 inches	90 millionths
Squareness:	
Compound slide	50 millionths
Full travel, spindle housing	90 millionths
Full travel, spindle	90 millionths



No. 3 Moore Jig Borer



No. 3 Moore Jig Grinder

10-year Deviation Guarantee

Lead Screws	50 millionths
Quill fit, or clearance (Jig Borer)	20 millionths
Vertical slide fit, or clearance (Jig Grinder)	50 millionths
Compound slide squareness	20 millionths
Base ways	30 millionths
Table ways	30 millionths
Squareness of spindle to plane of travel	50 millionths

Moore can now, with confidence, guarantee the *accuracy-plus-durability* of hardened, ground and lapped lead screws and ways, plus the other locating features of its No. 3 Jig Borers and No. 3 Jig Grinders. Here's why:

The first No. 3 Moore Jig Borer built has now been operating in our toolroom for 5 years, an average of 2,300 hours per year. We have also inspected several other No. 3 machines in customers' plants. Our experience with hardened, ground and lapped lead screws now goes back 30 years. All of this history has provided us with sufficient data to project the performance of our No. 3 machines over a 10-year period.

As a result, we will now *guarantee* that the basic locating features of the standard No. 3 Moore Jig Borer and No. 3 Moore Jig Grinder will not wear or deviate in normal use *beyond published tolerances* over a 10-year period more than the specified amounts shown above.

This guarantee is retroactive to include the No. 3 Moore Jig Borers and Jig Grinders already built and in use. It applies to original owners only, and is in addition to our unqualified 1-year guarantee.

You can call in our service man to check your machine at any time, at our regular charge. If this check reveals wear in excess of that specified above, we will correct the machine promptly at our expense.



Dick Moore

Richard F. Moore, President
Moore Special Tool Co., Inc.,
730 Union Avenue,
Bridgeport 7, Conn.

April 1, 1961

While in New York call Farnet 5-3236
(Bridgeport) for visit to our plant

ONLY MOORE TOOLS CAN OFFER THIS COMPLETE PACKAGE OF PRECISION



MOORE No. 3 JIG BORER
Locates and bores holes
to less than a "tenth"



MOORE No. 3 JIG GRINDER
Locates and grinds holes
to less than a "tenth"



MOORE UNIVERSAL
MEASURING MACHINE
Measures to
one-third of
a "tenth"



MOORE
ROTARY TABLE
Divides the circle
to less than 2 sec.

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Always a smooth, powerful cut
on the **HyPowermatic** ...



...with exclusive **HYDRAMACH**
TABLE DRIVE

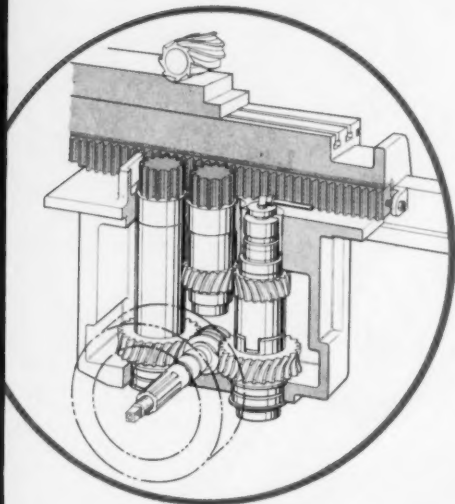
Three spindle heads, each taking a heavy cut on a lathe bed, are evidence of the smooth, powerful cutting capacity of CINCINNATI HyPowermatic Milling Machines. The one illustrated above is a No. 430-2614 Triplex, having 80 hp drive to the spindles. (Photo courtesy "Industrial World")

KNEE TYPE AND BED TYPE MILLING MACHINES • DIE SINKING MACHINES • VERTICAL BROACHING MACHINES
THE CINCINNATI MILLING MACHINE CO., CINCINNATI 9, OHIO

It's a fact! Husky CINCINNATI HyPowermatics subdue the toughest production milling jobs with a smoothness and ease that defy comparison. One reason is HYDRAMECH, Cincinnati's exclusive table drive unit that applies the driving force exactly where it belongs—*directly to the table, beneath the cutting force*—and not through long leadscrews that drive table brackets. The result is uniformly smooth cutting action on *every* CINCINNATI HyPowermatic regardless of size.

HYDRAMECH Table Drive's infinitely variable table feeds (up to 150" per minute) can be changed during milling by a simple twist of a dial . . . or automatically, with the variable feed attachment. HYDRAMECH also embodies automatic backlash elimination, permitting both conventional and climb milling.

Other cost-reducing features include: a wide range of automatic two-way table cycles; 16 spindle speeds; only three-gear contacts in spindle drive; Dynapoise vibration damping overarm. In addition, HyPowermatics are built up from standard and complementary units to provide low-cost special machine performance, as in the three-spindle machine illustrated. Details in Catalogs M-1909-3 and M-2020-2. Write or telephone **Milling Machine Division, The Cincinnati Milling Machine Co., Redwood 1-2121.**



CUTTER AND TOOL GRINDERS • ELECTRICAL MACHINING EQUIPMENT

CINCINNATI

MILLING MACHINE DIVISION

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May, 1961

MODERN MACHINE SHOP 11

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DUPLEX DUPLEX

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NEW YORK CITY

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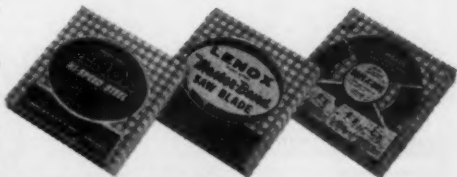
how much band saw mileage do you get?

"Not enough!" This is the most frequent answer. **Why?** Our recent field survey shows wrong blade type or wrong specifications used in over 50% of band-saw cutting. **Solution**—Choose one of the three blades developed by LENOX to cut fast and efficiently at lower costs. These LENOX blades fill every cutting requirement. **HIGH SPEED STEEL**—For automatic cut-off equipment in full production work. Rapidly cuts most of the tougher steels. **MASTER-BAND**—Special alloy steel for standard equipment, cutting at semi-production or production rates. Also used on some automatic cut-off applications. **DIEMASTER**—Regular bands, cut-to-length or coil stock, for general purpose cutting. Interested in greater band-saw mileage? Get a true appraisal of your cutting needs by writing American Saw, Cutting Analysis Dept. Briefly describe your machine, materials cut, and type of operation. Recommendations and engineering help are furnished without obligation.

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LENOX

**AMERICAN SAW
& MFG. COMPANY**
SPRINGFIELD 1, MASS.



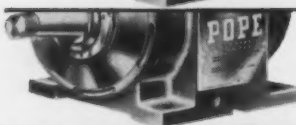
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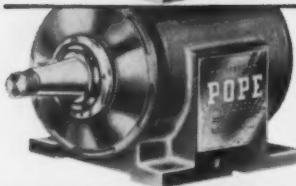
ANNOUNCING...



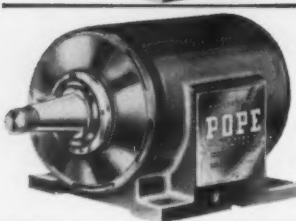
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**PRECISION
MOTORIZED
SPINDLES**



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1 to 20 horsepower — 900 to 3600 r. p. m.

Use this heavy duty, motorized unit for a wide variety of precision grinding and cutting operations.

Use it to drive precision machine tool spindles, test apparatus or research equipment.

Use it wherever low amplitude of vibration and *extra rigidity* mean more profit for you through better, faster production.

This Pope Precision Motorized Spindle is equipped with a Pope balancing type wheel holder for precision grinding.



Bulletin S-23 gives you complete information, dimensions and specifications. May we mail you a copy?

NO. 135

POPE

**ENGINEERS, DESIGNS AND BUILDS
PRECISION ANTI-FRICTION BEARING SPINDLES
FOR EVERY PURPOSE**

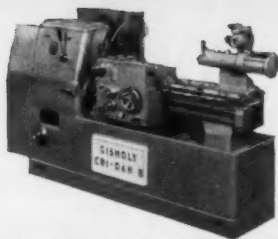
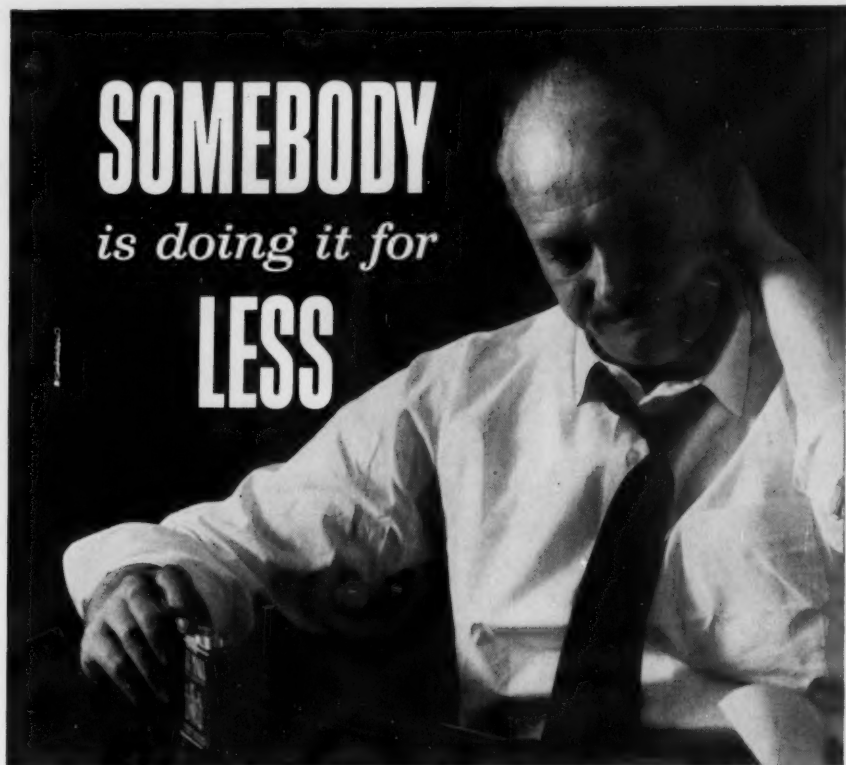
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Gisholt CRI-DAN Model B Automatic Threading Lathe — Sets up in 8-15 minutes. Inexpensive single-point carbide tools produce all types of internal and external threads: single- or multiple-start, coarse or fine, left- or right-hand, straight or tapered, standard or special form—in any material, including new high-tensile, hard alloys.

Call your Gisholt Representative or write for Catalog 1215.

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Factory-Rebuilt Machines with New-Machine Guarantee

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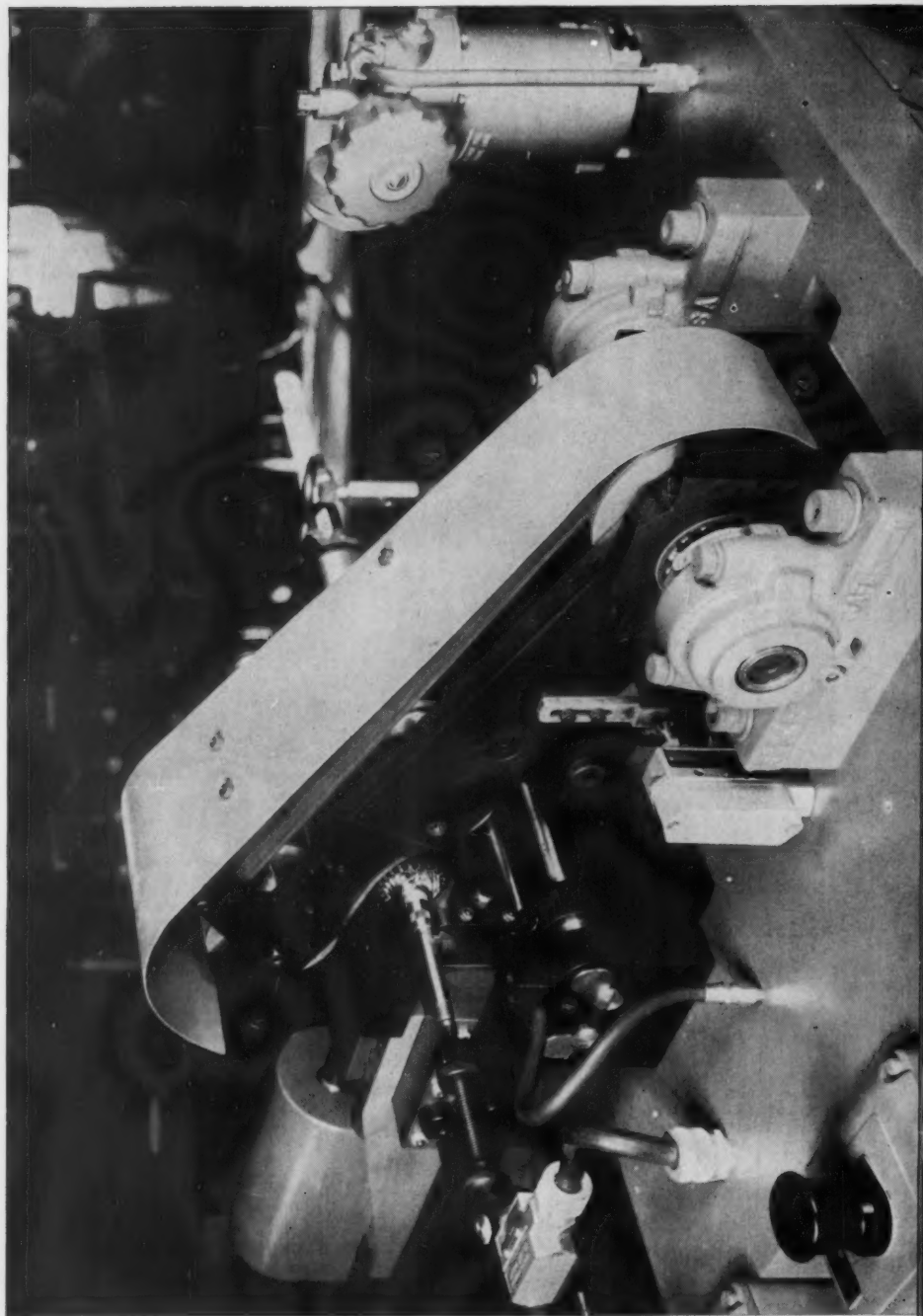
While others are saving 30% to 80% can you afford to stay with conventional methods?

With a Gisholt CRI-DAN High-Speed Threading Lathe, you can now use inexpensive single-point carbide tools to produce *quality* threads—simple or complex—*automatically*. CRI-DAN offers *direct* savings in initial costs, reduced threading times and tooling requirements—in-*direct* savings in tool inventory, materials-handling and floor space.

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MACHINE COMPANY
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and

in the South →

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anything,
anywhere

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VERSA-MIL®

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FOR WORK--
yet move easily
from job to job

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SLOT • GRIND • DRILL
at lower cost

Compact, rigid, portable units
in three sizes. Perform in any
position. Built-in power and
feeds. Use independently or
attach to machine tools for
secondary operations. Save
handling, moving, set-up and
down-time. Also machine
in-place parts too big for
standard tools.

SEE THEM AT ASTME SHOW, N. Y.
BOOTHS 2428 & 2422

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DISTRIBUTOR FOR A DEMONSTRATION
or write for Bulletin VM-60

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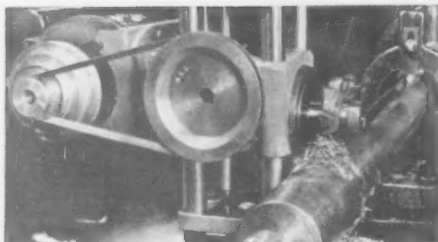
3 sizes for all
tooling needs:

SMALL WORK MODEL 1— $\frac{1}{2}$
hp., removes metal at $\frac{1}{8}$ cu.
in. per minute,* 10" min.
lathe mounting.

MEDIUM DUTY MODEL 2—
 $\frac{3}{4}$ hp., removes metal at $\frac{3}{8}$
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min. lathe mounting.

LARGE WORK MODEL 3— $1\frac{1}{2}$
hp., removes metal at $1\frac{1}{2}$
cu. in. per minute,* 18"
min. lathe mounting.

* in mild steel



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ALL-PURPOSE, PRECISION
METALWORKING TOOLS

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Drill Heads • Micro-Drills • Drill Grinders • Tool Post
Grinders • Hand Grinders • Flex-Shaft Tools • Precision
Spindles and Accessories.

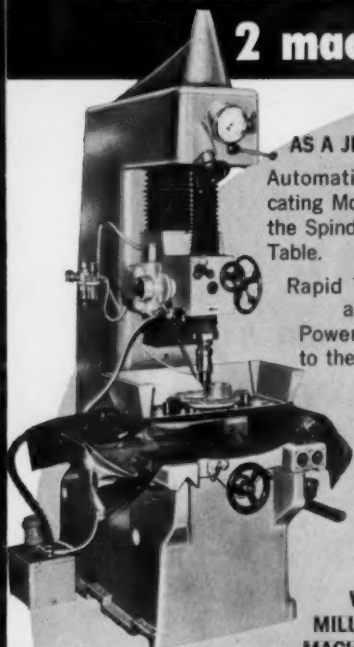
THE DUMORE COMPANY

1302 Seventeenth Street, Racine, Wisconsin

MANEX

OPTICAL JIG BORER and JIG GRINDER

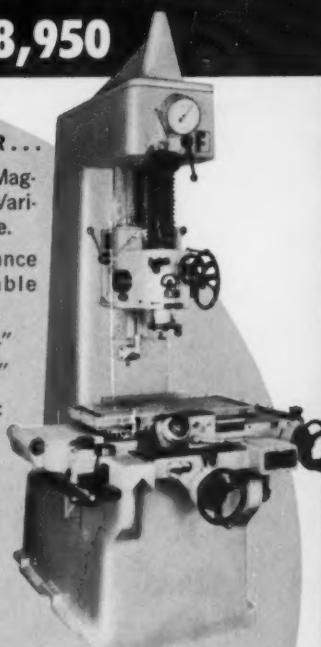
2 machines-in-one \$8,950



AS A JIG GRINDER . . .

Automatic Reciprocating Movement of the Spindle and the Table.

Rapid Traverse and Power Feed to the Table.



AS A JIG BORER . . .

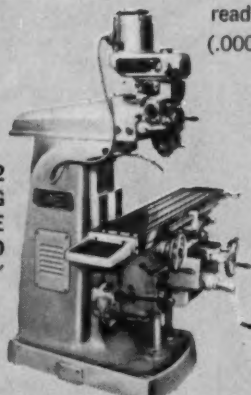
1.5 H.P. Motor Magnetic Brake and Variable Speed Drive.

Maximum Distance Spindle to Table 25½" or 31½".

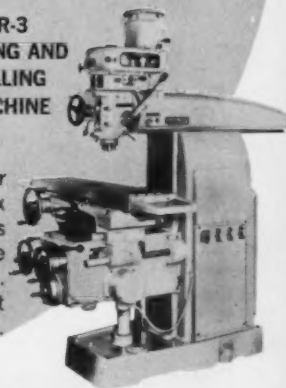
Table 12"x24"
Feed 12"x18"

Micrometric reading
(.0001")

VR-2
MILLING
MACHINE
HIGH SPEED
TABLE 12" x 48"



FR-3
BORING AND
MILLING
MACHINE



VR-2
HYDRAULIC
COPYING MACHINE

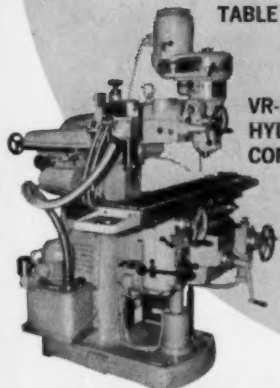


Table 12" x 48"
3 Ways Automatic
Can be used either
as Milling or Copying
Machine

4.2 H.P. Motor for
Spindle. Table 13" x
59" Power Feeds
and Rapid Traverse
in All Directions.
No. 40 Taper. Net
Weight 5,300 lbs.

See Us At Booth #1706 ASTME Show

DISTRIBUTORS: A FEW TERRITORIES OPEN. WRITE

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MANEX MACHINERY CORPORATION

204 Central South Park • New York, N. Y.

TELEPHONE CIRCLE 6-5277



**BLAZING
NEW
TRAILS...**

WITH

BARNES[®] SUPREME
HIGH SPEED STEEL
BAND SAW BLADES

BARNESUPREME HIGH SPEED STEEL BLADES are designed for use on high speed, heavy-duty sawing machines. They assure the fastest possible cut-off of all metals, including the tougher alloy steels.

BARNESUPREME blades are the result of new techniques in heat treating and welding processes developed by Barnes. These new techniques produce tooth tips highly resistant to wear and greatly increase blade flex life.

Specify BARNESUPREME blades for faster cutting, more straight cuts per blade and fewer blade changes per job. Call your Barnes Distributor today.

Your nearby Barnes Distributor gives you fast service, simplifies your ordering and reduces your inventory. He and a Barnes Sales Engineer are available to work with you on all your metal-cutting requirements.

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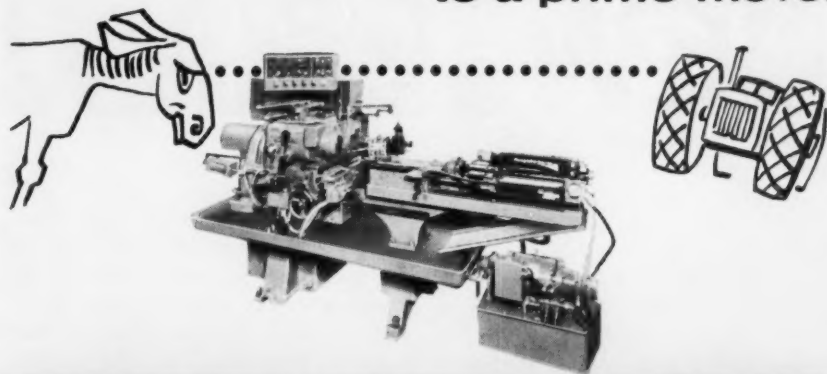
W. O. BARNES CO., INC.

1297 TERMINAL AVENUE • DETROIT 14, MICHIGAN

BARNES-DISTRIBUTOR teamwork means quality products...
available locally at lowest possible cost.



**Transform your stubborn mule
to a prime mover**



PROVED... TURRET LATHE AUTOMATION

**by Acme
HYDRIVE**

Hydrive transforms older turret lathes from limiting factors to high volume producers! Technical management is being stimulated to machine tool re-evaluation in view of the proved success of automating turret lathes with Hydrive. Stepping up manual turret lathes to automatic operation—easily capable of tripling output—will multiply your capacity at surprisingly low cost. Without the substantial expenditure of new equipment, management reaches increased production goals . . . with wanted accuracy and reliability.

Write today for complete Hydrive information . . . how Hydrive will make your turret lathe far more productive. Also available upon request, FREE Hydrive film.

ACME INDUSTRIAL COMPANY

200 North Laflin Street/Chicago 7, Illinois

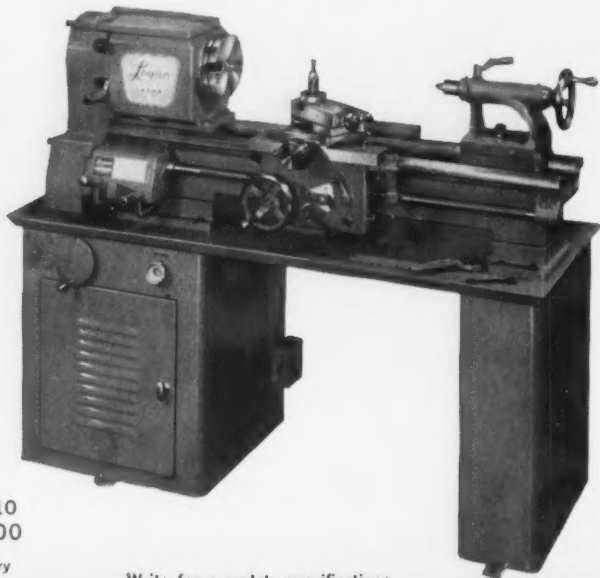
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NEW!

Logan

14" LATHES
BEST DOLLAR VALUE
IN THE LATHE FIELD

These new Logan 14" swing lathes are **DEPENDABLE**. Their capacity permits a broad range of machining operations. They have a 14 $\frac{1}{4}$ " swing over bed, a swing over saddle cross slide of 9", and a center distance of 28". Logan lathes are **ACCURATE**. The ball bearing spindle has a 1 $\frac{1}{16}$ " hole and a draw in collet capacity of 1 $\frac{1}{16}$ ". The variable speed drive (40 to 1400 RPM) adjusts while running—no need to stop and shift belts! Also, the two V-ways and flat ways are precision ground. Logan 14" lathes are **RUGGED**. The 10" wide and 56" long lathe beds are braced by oversize ribs to withstand torsional stresses. The Logan 14" lathe is your best dollar value. No other lathe in this price category offers you this same big work capacity with variable speed drive.



Model 6510
\$1,775⁰⁰

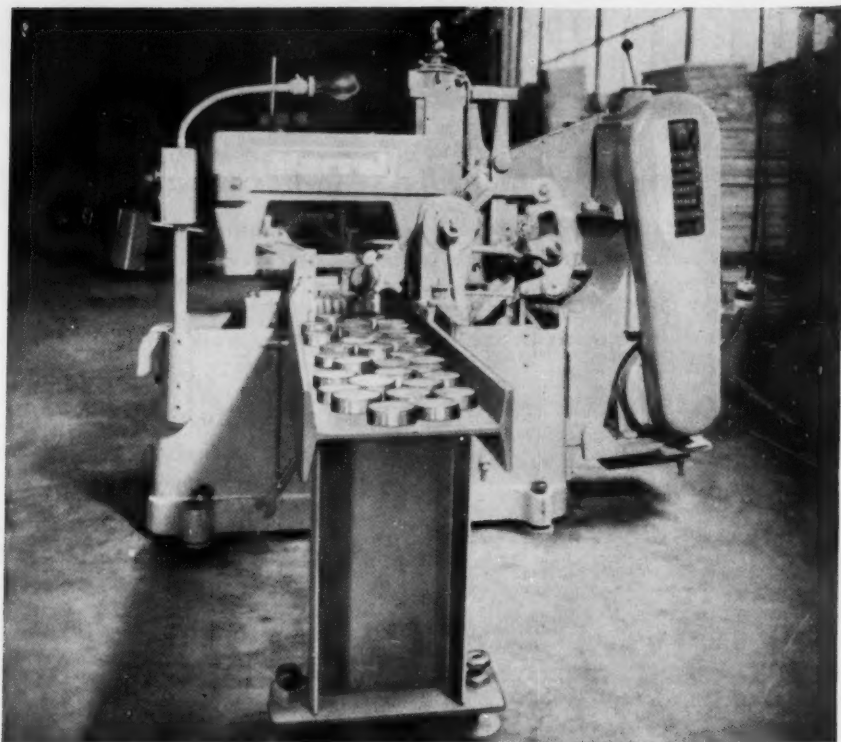
F.O.B. Factory

Write for complete specifications.

Logan

LOGAN ENGINEERING CO., DEPT. L-561
4901 W. Lawrence Ave., Chicago 30, Ill.

For more data circle 332 on Postpaid Card



Payoff End of a Production Marvel

A cut-off saw's value is proven at the discharge end of the machine. How quickly the trough is filled with accurately cut-off pieces can mean the difference between profit and loss on many jobs.

The R. J. Sudrick Co., Des Plaines, Illinois, manufacturers of precision aircraft components had to cut-off 4600 blanks from 3 1/4" round, 303 Stainless Steel Bars.

They bought our MARVEL No. 6A4 High Speed Heavy Duty Automatic Bar Feed Hack Saw Machine; used MARVEL High-Speed-Edge Hack Saw Blades, and got the high production, accuracy and economy they desired.

- | | |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PRODUCTION? | Constant at 20 pieces per hour floor to floor |
| ACCURACY? | Held well within the permissible tolerance of +.010 -.000 |
| BLADE COST? | Just 1 1/2¢ per cut. Only twenty-three MARVEL blades were needed to make the 4600 cuts, and not a single blade failure due to blade breakage. MARVEL High-Speed-Edge Blades are unbreakable. |

The point is this: MARVEL Metal Cutting Hack Saws equipped with MARVEL High-Speed-Edge Hack Saw Blades are an unbeatable combination for economical, accurate and safe cutting-off.

If your hack saws are not producing the economy you need to meet today's competition, try MARVEL High-Speed-Edge Blades. They will give you the competitive edge every time. Write for Catalog C-85 which has the complete story on MARVEL Hack Saws and Band Saws, Hack Saw Blades and Band Saw Blades.

ARMSTRONG-BLUM MFG. CO.

5700 W. BLOOMINGDALE AVE., CHICAGO 39, ILL.



For more data circle 333 on Postpaid Card

May, 1961

MODERN MACHINE SHOP 23

Do you know what metallizing can do for you today?

With today's improved metallizing materials and methods:

PLANT EXECUTIVES find new ways to slash maintenance costs, reduce downtime, cut machine parts inventory...

JOB SHOP OPERATORS find new ways to build highly profitable business doing parts-salvage and maintenance work for plants in their area.

JOB SHOPS
make good money with
metallizing because they save
good money for local firms.

METCO has prepared a special bulletin detailing actual operations and costs of typical flame spraying work on shafts, templates, bearings, many other surfaces. Use coupon to get your free copy.

NEW! Business-building kit for job shops, to help METCO equipment owners build new business, pay off investment in minimum time, and use flame spraying to increase other machining and welding business. Contains samples of direct mail letters, post cards, envelope stuffers, photos, advertising mats. These promotion materials are available in lots of 100 at our cost, well below what you'd have to pay to print your own. One copy of kit available free — send for it today. (See coupon.)

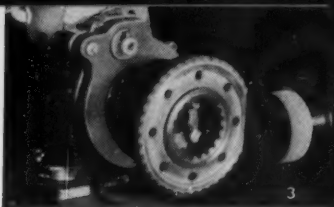
These real-life examples show how plants save money, job shops make money with metallizing

Necks of winding rolls in a textile mill were formerly repaired by a slow machining method, requiring highly skilled labor. Now the worn necks are built up with flame sprayed metal, quickly machined to size. Savings run \$20,000 a year.

A job shop in California specializes in flame spraying oil well pump plungers, gets all the business it can handle in spite of the fact that the plungers it hard-faces last eight times as long as new ones. The largest ones cost only \$45.00 to rebuild, against \$110 to replace. Volume on just this one profitable metallizing service: \$35,000 a year.

Valve plugs and seats, working in sand, oil and salt water, lasted only a few hours in service. Hard-faced by welding, a set cost \$155, lasted from 3 to 8 hours. When flame sprayed with tungsten carbide powder, service life was increased to a minimum of 2 weeks, 4100% longer! Cost of metallized set, \$73. But reduced downtime far outweighs the dollar savings.

A Connecticut job shop makes a very good profit when it flame sprays small



Any good mechanic can quickly master the three basic steps of metallizing: 1. prepare the surface; 2. flame spray; 3. finish.

shafts for \$27.50. The customer is happy, too—he formerly had to pay over \$50 to have shafts built up with welding.

The same job shop salvaged a big degreasing tank, value \$2,850, by flame spraying with zinc for \$683. The shop made money, the customer saved money.

A shipbuilding company installed metallizing equipment to repair such parts as pump rods, pistons, crank shafts for diesel engines, stern bushings, valve stems. A badly worn tugboat shaft, replacement cost \$3,000, was repaired and made better than new for \$400. That job alone more than paid for the METCO equipment.

From these cases you can see how modern metallizing pays, whether in plant maintenance departments or in job shops serving the many companies that

don't need their own installation. Wherever there's wear, in rotary or sliding action, there's an opportunity to save money and make money.

New and improved materials

Among these new materials are a number of nickel, chrome, boron hard facing powders. Sprayed tungsten carbides are also widely used. Many others are available to give new values to the basic benefits of metallizing, which may be summarized as: less downtime; far less machining or grinding time, reduced parts inventory; and "better than new" performance of the metallized parts.

With savings like these there is plenty of leeway for good job shop profits and big savings for manufacturing plants. To learn more about these opportunities, check the coupon and send it off today.



METCO INC.
FORMERLY METALLIZING ENGINEERING CO., INC.
Flame Spray Equipment and Supplies

1177 Prospect Avenue, Westbury, L. I.,
New York Telephone: Edgewood 4-1300
Cable: METCO. In Great Britain: METCO,
Ltd., Chobham-near-Woking, England

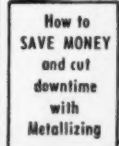
METCO, INC., 1177 Prospect Avenue, Westbury, L. I., New York

JOB SHOPS ONLY



- ☐ Send Bulletin 14, "How Job Shops Make Money With Metallizing"
- ☐ Send Business-Building Kit
- ☐ Have Field Engineer Call

PLANT MANAGEMENT



- ☐ Send copy of Bulletin 15, "How to Save Money and Cut Downtime with Metallizing"
- ☐ Have Field Engineer Call

Name

Title

Company

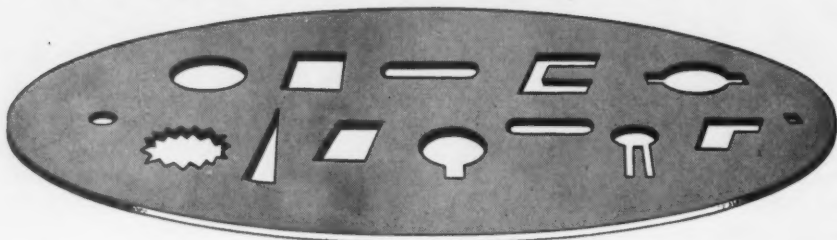
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City

Zone

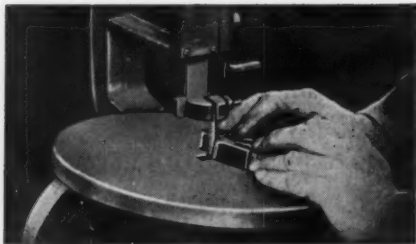
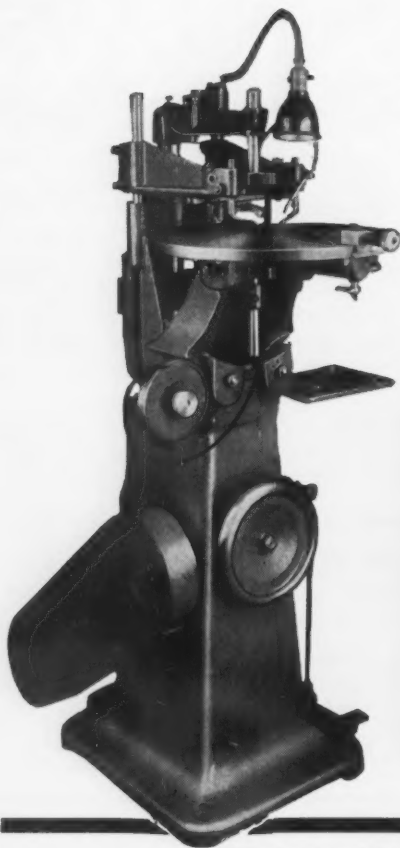
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FOR CONTOURS LIKE THESE . . .



Freak contours — more conventional shapes — internal or external forms. In any case, you'll save valuable time by producing the job on an Oliver of Adrian contour sawing and filing machine.

Parts for jigs and fixtures, dies, gages, templates and special machine production can be shaped to dimension faster — easier — at less cost. No hand filing or semi-finishing operations. Better investigate Oliver today. Just write. Available in five sizes — bench or pedestal.



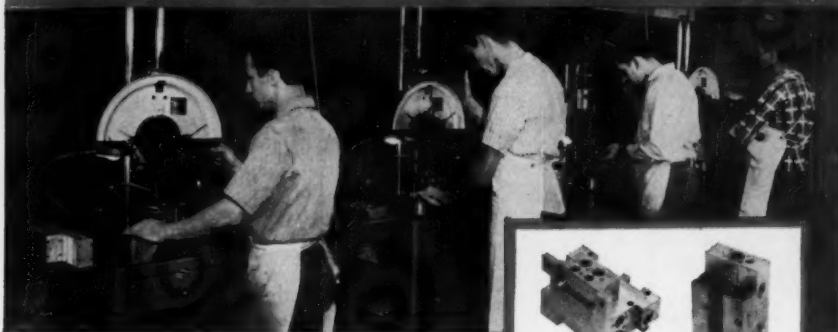
OLIVER of ADRIAN

OLIVER INSTRUMENT COMPANY

1430 E. Maumee St. ■ Adrian, Michigan

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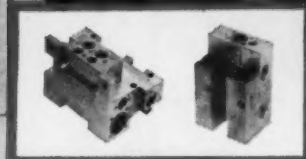
BURGMASER Triples Valve Body Production ... Scrap Parts Reduced By Hundreds



58 Holes Drill and Ream Each Body

Micro Tool and Engineering Company, North Hollywood, California replaced six in-a-line spindle drills with 4 new Burgmaster Bench Model six spindle turret drills to triple the production of aluminum hydraulic valve bodies that required 58 drilled and reamed holes in each part. Two Burgmaster machines, using 10 of the available 12 spindles are now used to replace the six in-a-line single spindle drills for drilling and reaming 58 holes from 1/32" (30 diameters deep) to 5/16" diameter. Spindle speeds of 6200 rpm permit .014 drilling efficiently to 5/16" depth. The other two Burgmaster units are used to drill and ream a variety of hydraulic valve bodies. Savings on this project of 5 hours per part has been effected through the elimination of load, unload, positioning and drill change operations. The new 24 drill spindles now take up only 60 per cent of the floor space required by the original six single spindle machines.

WRITE FOR LITERATURE covering machines and accessories including the Burgmaster AUTOMATIC Bench Model Turret Drill with power feed and the new hand positioning table accessory. Dealers located in principal cities.



Job Facts

Company:	Micro Tool and Engineering
Machine:	Burgmaster Bench Model 6-Spindle Turret Drill
Parts:	Aluminum Valve Bodies
Operation:	58 holes drill and ream each
Holding:	Box Jig with Drill bushing
Former method:	Six single spindle drills
Present method:	2 Burgmaster Turret Drills
Advantages:	Triples production, eliminates scrap, cuts floor space. 66%.

Kearney & Trecker, C.V.A. Ltd., Sole Agents for Great Britain, British Commonwealth and Western Europe.



BURGMASER CORPORATION

Small Tool Div., Burg Tool Manufacturing Co., Inc.
13226 S. Figueroa St., Box 311, Gardena, Calif.
Phone: FAculity 1-3510 Phone, wire or write Dept.OA

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EMPIRE

**CUT-OFF
BLADES**

(VARIABLE TYPE)

EMPIRE
TOOL COMPANY

FASTER, accurate cut-off
LONGER cut-off blade life
SMOOTHER cut-off surfaces

WIDEST RANGE OF BLADE MATERIALS

1. Empire cut-off blades are available in four grades of H.S. Steel (high-cobalt, high-vanadium). Range covers most any requirement for H.S. Steel tooling.
2. Solid cast-alloy blades (non-ferrous, cobalt-chromium-tungsten) have high red-hardness, superior resistance to abrasion and are non-magnetic.
3. Carbide tipped cut-off blades come in four grades of carbide—the best carbide for each job can be furnished.

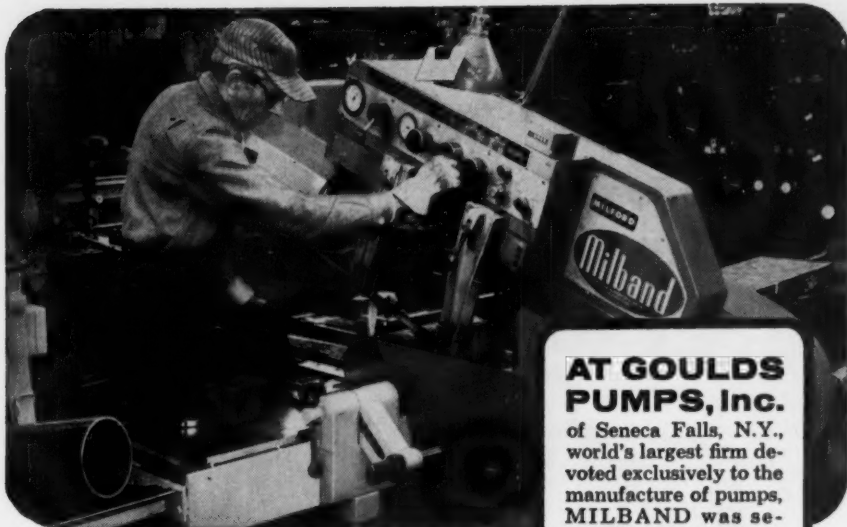
SUPERIOR DESIGN FEATURES

1. **Faster Cutting**—precision grinding of all blade surfaces assures sharper cutting edges.
2. **Reduced Friction**—hollow-ground top causes chips to collapse, relieving friction against sidewall of cut.
3. **Cooler Cutting**—collapsed chips permit coolant to reach blade cutting edges.
4. **Greater Precision**—blades are precision ground on all surfaces, centrality of head to shank is held to close tolerances.
5. **Smoother Cut-Off Surfaces**—sharper cutting edges, collapsed chips, better coolant flow, and liberal side clearances add up to smoother cutting.
6. **Longer Blade Life**—wide selection of blade materials, finest blade design, resharpening on front face only, assures longer life on every cut-off job.

*Made under license issued by John Milton Luers
Patents, Inc.*

11503 LAMBS ROAD • MEMPHIS, MICHIGAN

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AT GOULDS PUMPS, Inc.

of Seneca Falls, N.Y., world's largest firm devoted exclusively to the manufacture of pumps, MILBAND was selected to keep pace with accelerated production schedules.

MILBAND® Band Saw Machine Tool

"... at least three times faster

... far less waste of materials," commented

Methods Engineer William Conley about the MILBAND which replaced another type of cut-off machine in the Goulds Pumps plant. "The MILBAND makes such a neat square cut," he said, "that we have found we can produce more parts from the same amount of stock." Exceptionally long life of the MILFORD REZISTOR High Speed Steel Band Saw Blade and man-hour savings realized through automatic operation of the MILBAND Machine are other reasons why engineers at Goulds Pumps say, "The MILBAND is doing a good job for us."

The variety of rugged work handled by the MILBAND Machine at Goulds Pumps includes sleeve, shaft and piping stock of Monel, stainless steel and carbon steel. Sturdy MILBAND Machine construction that eliminates destructive vibrations — large 22" blade wheels, 30° blade twist, 15½" pivot span and other features — all add up to the excellent Blade Control Engineering that gives MILBAND the edge over other cut-off machines.

Demonstrations are easily arranged. Write us for the name of the MILBAND dealer nearest you ... and for this free circular explaining all the cost-cutting facts about the MILBAND Machine Tool.

THE HENRY G. THOMPSON & SON CO.
Chapel & Will Streets, New Haven 5, Connecticut
Saw Specialists for 85 Years

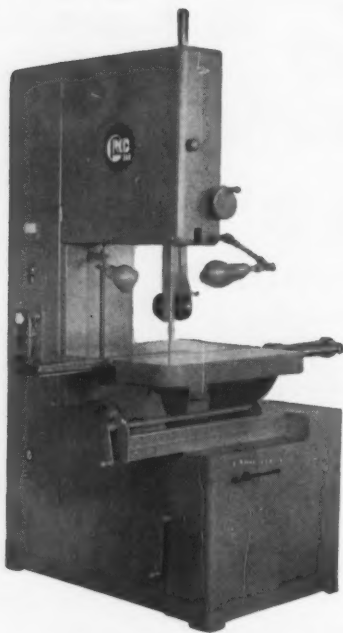
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GROB SPELLS THE DIFFERENCE IN BAND SAW MACHINES

The new GROB 24" universal band saw
has all the famous GROB features:

*Quality • Efficiency • Durability • Strength
Utility • Low Maintenance • Reasonable Cost*



• Speeds infinite from 35-12000
FPM covers both cold and hot
sawing

• Variable drive 3-speed trans-
mission with precision rolled
gears and splines transmits
15 HP

• Hydraulic table feed

See the difference dem-
onstrated in our dealers'
showrooms

or

Write GROB INC. for
complete specifications

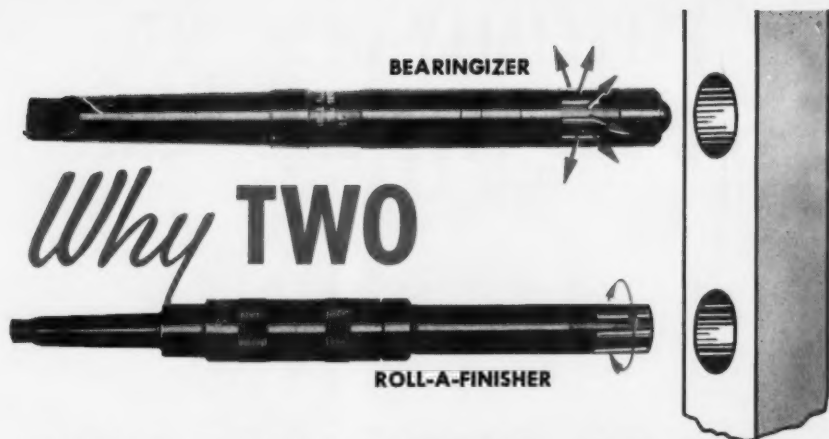
GROB also manufactures a complete line of:



**BUTT WELDERS
FILING MACHINES
GEAR ROLLING MACHINES**

GRAFTON, WISCONSIN

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Why TWO HOLE FINISHING TOOLS?

For fine surface finishing (2-10 microinches) either tool will give excellent results. They differ in *speed*, final *accuracy*, *what* hole preparation is required and the *degree* of hardness achieved.

	BEARINGIZER	ROLL-A-FINISHER
speed	150 ipm	20-50 ipm
accuracy	low tenths	some improvement over hole preparation
work preparation required	close preparation because of limited ductility of materials under cold forging	rough bored hole
surface hardness	increased 10-30%	increased 5-10%
tool wear	compensated by replacing rolls	compensated by simple adjustment
thin wall structures	special fast rise cam construction maintains roundness	creates out-of-round conditions

Your local Cogsdill engineering representative will be glad to recommend the proper tool for you and will work with your staff to insure proper use and performance.



For the complete story on better finishes, write for catalog

Cogsdill

TOOL PRODUCTS, INC.

12980 W. EIGHT MILE ROAD • OAK PARK 37, MICHIGAN

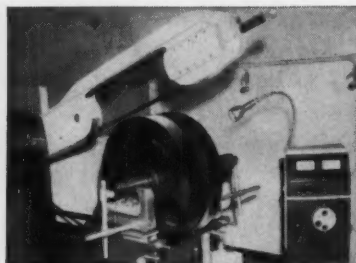
Western Branch: phone PL 3-3321, Los Angeles — In Canada: Barmac Ltd., Toronto

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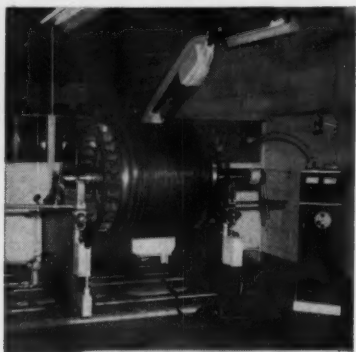
ESPECIALLY DESIGNED FOR JOB TYPE BALANCING

- Balance a wide range of work on the same machine — no special tooling, coupling devices or accessories needed to change jobs!
- Set-up time less than 2 minutes!
- 4 models for use in single-piece, short-run or long-run production quantities!
- Low initial cost, low operating cost — even smallest shops can afford their own precision balancing equipment!
- Stewart-Warner trains your operator in your plant, on your products!
- For in-place precision balancing of all-rotating machinery!

Stewart-Warner also manufactures a completely portable balancer. Write for full details.



Balancing a 2000-lb. turbine drive gear on the Model 708 Balancer.



4500-lb. Squirrel Cage Induction Rotor on Model 708 Balancer.

Only Stewart-Warner Balancers Offer these Maximum and Minimum Ranges:

Model No.	Weight Range	Diametral Range	Length Range	Sensitivity**
2390	(portable)	In place balancing of all rotating machinery		
*703	1/2 lb. to 500	1/2" to 44"	4 1/4" to 55"	0.01 inch-oz.
*704	1/2 lb. to 1000	1/2" to 44"	4 1/4" to 55"	0.01 inch-oz.
*708	1 lb. to 5000	1" to 68"	7" to 83"	0.04 inch-oz.
Special	20 pounds to over 50,000 pounds — state requirements.			

*Various weight and length modifications available upon request.

**Higher sensitivity available for all models.



STEWART-WARNER CORPORATION INDUSTRIAL BALANCER DEPARTMENT

Dept. CA-51, 1850 Diversey Pkwy., Chicago 14, Ill.

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Write for new
illustrated
brochure!



NEW! BI-TIP OIL HOLE DRILL

Replaceable Two Flute Tips Reduce Costs; Single Flute Body Assures Maximum Chip Clearance

1 Two flute replaceable tips are available in carbide tipped, solid tungsten carbide, or solid high speed steel. After repeated sharpenings have expended usable cutting tip area, a new tip can be brazed to undamaged body at a fraction of original drill cost.

2 Single flute body has margin and land for high durability. Design of single flute body assures maximum chip clearance that is especially effective in deep hole drilling of aluminum.

3 Two coolant holes in every Bi-Tip drill—regardless of drill diameter ($\frac{3}{16}$ " to 1"), there are two coolant holes for even and constant flow of coolant to cutting lips. Two hundred pounds pressure is more than sufficient—do not need any special oil—just ordinary soluble solution.

4 Single pass deep hole drilling—advanced design concepts plus the high quality materials and workmanship found only in *Bi-Tip* drills permit drilling the entire depth of a hole with one pass. Cutting lips remain cool, rapid chip removal is inherent, and drilling time is greatly reduced.

5 This drill is especially designed for aluminum . . . and will drill at speeds and feeds never before dreamed of. But it will perform very well in cast iron, bronze, and even in steel.

At Detroit Reamer & Tool Company are engineering specialists and testing facilities available for solving your drilling problem—we welcome inquiries regarding unusual drilling applications.

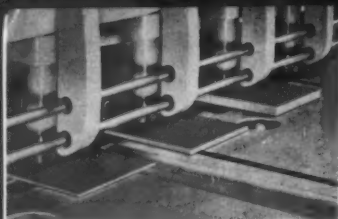
For further information concerning the high performance characteristics and unusual cost reduction features of Bi-Tip drills, write to:

**DETROIT REAMER
& TOOL COMPANY**

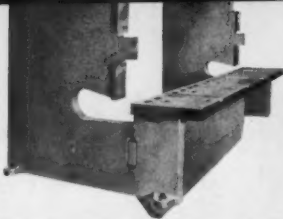
P.O. BOX 174 • BIRMINGHAM, MICH.



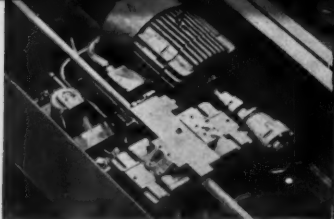
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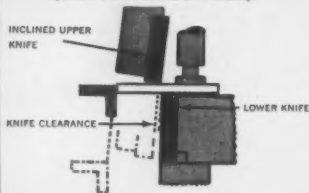
Hydraulic holdowns hold work securely.



Interlocked construction eliminates load supporting welds.



Compact manifold block replaces usual piping.



Centralized controls improve operator's productivity.



Adjustable rake gives you extra shearing capacity.

Inclined ram makes use of four edge knives practical.

CINCINNATI® hydraulic shears



Cincinnati Hydraulic Shears include in the standard price many features which cost extra on competitive shears. Several of these are shown above. Combined with an exceptional range of shearing capacity in one frame, they make any Cincinnati Hydraulic Shear a profitable investment. Request Bulletin HS-1 for complete details and features.

Shapers / Shears / Press Brakes

THE **CINCINNATI**
SHAPER co.

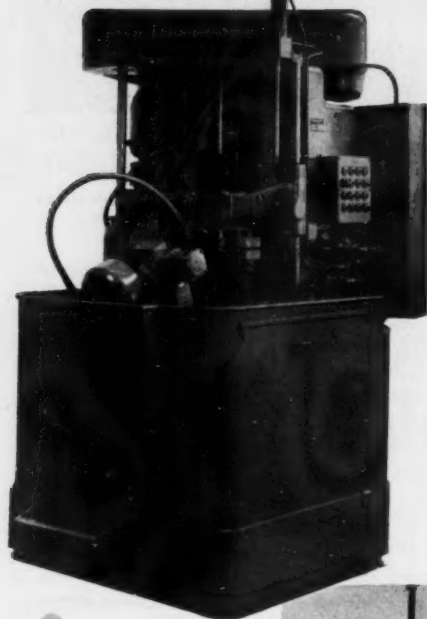
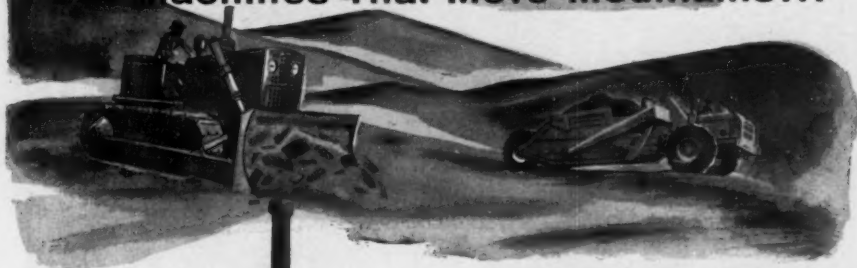


Cincinnati 11, Ohio, U.S.A.

United Kingdom: The Cincinnati Shaper Co., Ltd., Glasgow, Scotland

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Machines That Move Mountains...



THE NEW 12" x 20" 12-HD

Designed to produce large, heavy-duty gears at high-production speeds.

Can be equipped with lead differential, electric hob shifter and hydraulic controls.



GEARS

from the

NEW 12-HD

LEES-BRADNER

You asked for it and Lees-Bradner has built it... after years of design planning and months of building and testing.

This rugged hobbing machine — known as the 12-HD 12" x 20" — will produce gears up to 8, 9, 10, even 12 inches in diameter at mass production speeds. A revolutionary innovation is the new variable speed A.C. drive, using stock — not special — stock A.C. motors!

Now truck, tractor and earthmoving equipment manufacturers can generate heavy-duty gears as efficiently as smaller ones have been made.

Write Lees-Bradner for all the details — or get in touch with our representative in your area.

SPECIFICATIONS

Rated capacity in steel	4 D.P.
Max. diameter capacity	12"
(with 5" hob)	
Max. helix angle	45°
Taper in work spindle nose	16 B & S
Floor space	60" x 60"

IMPROVING GEARS FOR 50 YEARS

the
LEES-BRADNER
Company

CLEVELAND 11, OHIO, U.S.A.

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May, 1961

MODERN MACHINE SHOP 35



NEW CLAUSING 20" HEAVY-DUTY DRILL PRESS

**POSITIVE-POWER VARIABLE
or
STEP PULLEY 5 or 10 SPEED
COUNTERSHAFT DRIVES**

20" variable drive drill
with 1 HP motor, switch.
Ready-to-run — only
\$508.00. Order No. 2271

- **SPEED RANGES —
150 to 2000 RPM**
Dial speeds with variable drive model.
- **PRODUCTION RATED
CAPACITIES**
Dia. hole in cast iron.....1 1/4"
Dia. hole in steel.....7/8"
- **GEAR DRIVEN POWER FEED or
HAND FEED**
- **MACHINED and BALANCED
PULLEYS**
- **19 1/2" x 22" PRECISION
GROUND TABLE — 4" COLUMN
with 1/2" WALL — MASSIVE,
GROUND BASE**
- **READY-TO-RUN — MOTOR and
SWITCH INSTALLED — WIRED —
FACTORY TESTED**

Clausing drills out-perform — on continuous production, in the tool room, maintenance shop — every application — because they are built better. Ask your dealer to prove it! And write for literature on the new 20" and 15" models.

CLAUSING

DIVISION OF
ATLAS PRESS COMPANY

OUTSTANDING VALUES IN PRECISION MACHINES



5-112 N. PITCHER STREET, KALAMAZOO, MICHIGAN
For more data circle 345 on Postpaid Card

► **HIGH SHEARING
SPEED**—Up to

18,000 cuts per
8 hour shift.

► **CLEAN, SQUARE
CUTS**—Shows up

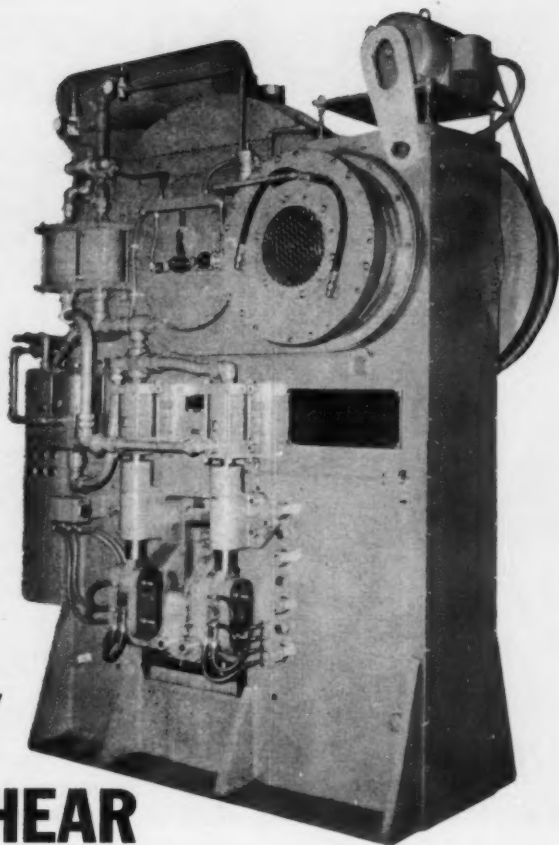
hidden defects.

► **COMPACT DESIGN**

—Saves floor
space.

► **AUTOMATIC FEED
TABLES**—Available

to your require-
ments.



'BUFFALO' BILLET SHEAR

Now—enjoy peak production on your billet cutting jobs. This new 'Buffalo' Billet Shear is ruggedly-built for maximum years of dependable, trouble-free performance. Greatest output at lowest cost is assured by efficient high speed operation. Clean, square cut billets

permit high quality finished forgings. Features include alloy steel frame, electrical controls and pneumatic automatic oiling system.

For full details, including capacities available, contact your machine tool dealer or write us direct.



MACHINE TOOL DIVISION **BUFFALO FORGE COMPANY**

Buffalo, New York
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.



'Buffalo' Air Handling
Equipment
to move, heat, cool, dehumidify
and clean air and other gases.



'Buffalo' Machine Tools to drill,
punch, shear, bend, slit, notch
and caps for production
or plant maintenance.



'Buffalo' Centrifugal Pumps
to handle most liquids and
slurries under a variety
of conditions.



Squaler Machinery
to process sugar cane, coffee
and rice. Special processing
machinery for chemicals.

For more data circle 346 on Postpaid Card

NEW GORTON RAIL-TYPE MILL



**Designed for
numerical control!**

To satisfy the exacting requirements of numerical control, Gorton announces the all-new Double-Column Rail-Type Milling Machine. Designed for positioning and continuous path contouring system applications.

Features

- Precision ball bearing screws with preloaded nuts
- Positive anti-backlash drive system
- Bed-type design
- Electric or hydraulic motor control of axis movement
- All way surfaces guarded
- Unique air-balanced vertical slide
- Various types of heads available
- Spindle speed selection — manual or programmed
- Automatic lubrication

Specifications

Table	- - - - -	22" x 32"
Table Travel	- - - - -	(X Axis) 24"
Rail Slide Travel	- - - - -	(Y Axis) 32"
Vertical Slide Travel	- - - - -	(Z Axis) 10"
Quill Travel	- - - - -	(Manual) 4"
Spindle Speeds	- - - - -	80-10,000 R.P.M.
Clearance between Columns	- - - - -	36"

See this machine in operation at the Thompson Ramo Wooldridge Booth, ASTME Show



A Gorton Product, the Finest of Its Kind!

GEORGE GORTON MACHINE CO.

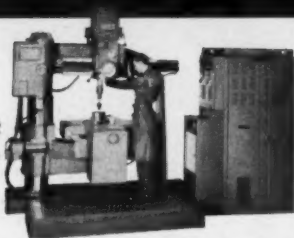
1705 RACINE STREET, RACINE, WISCONSIN

Milling, Die Sinking, Profiling and Engraving Machines with Manual Hydraulic, Electro-Hydraulic or Numerical Guidance Systems
SINCE 1903 Special Machines and Automated Transfer or Indexing Machines. Cutting Tools and accessories... Defense and special products

For more data circle 347 on Postpaid Card



The Indispensable



Drilling Machine

In every shop there is one machine tool you "can't get along without". This new Numerically Controlled Layout Drill is that kind of machine tool.

It's simple, easy to operate.

Fast, 3 seconds average, hole-to-hole. Accurate, $\pm .002$ " on location. Handles big work (24" x 42" table). General Electric Mark II numerical control system with full zero offset.

It's your best buy in numerically controlled drills. We say it's indispensable. In our own shop this FOSDICK N/C Layout Drill eliminated the need for 250 fixtures in one ten-week period. In that short time it more than justified its cost. It can do the same for you.

Get a proposal from FOSDICK.

FOSDICK

The FOSDICK Machine Tool Company
Cincinnati 23, Ohio

For more data circle 348 on Postpaid Card



FINISH:

*Reason enough
to buy LeBlond*

The glass industry is beginning to turn to mold plungers hard-surfaced with Colmonoy 6 to withstand the corrosion of molten glass. At 57-59 Rockwell C hardness, you don't machine such plungers on ordinary lathes—if you can machine them at all.

Yet Overmyer Mould Company of Winchester, Ind., turns Colmonoy coated plungers in 3 passes to a 10 micro-inch finish. That's more than fine enough to use as-machined.

Overmyer does it with 15" LeBlond Dual-Drive Lathes equipped with LeBlond tracers and constant surface speed control. From 1000 rpm at start of cut to 125 rpm at finish the Dual-Drives supply smooth, vibrationless power.

Rock-steadiness for turning rock-hard materials . . . Rigidity without excess weight or size . . . These are strong reasons to buy a lathe. They are reason enough to buy LeBlond.



THE R. K. LeBLOND MACHINE TOOL CO.
World's Largest Builder of a Complete Line of Lathes
CINCINNATI 8, OHIO

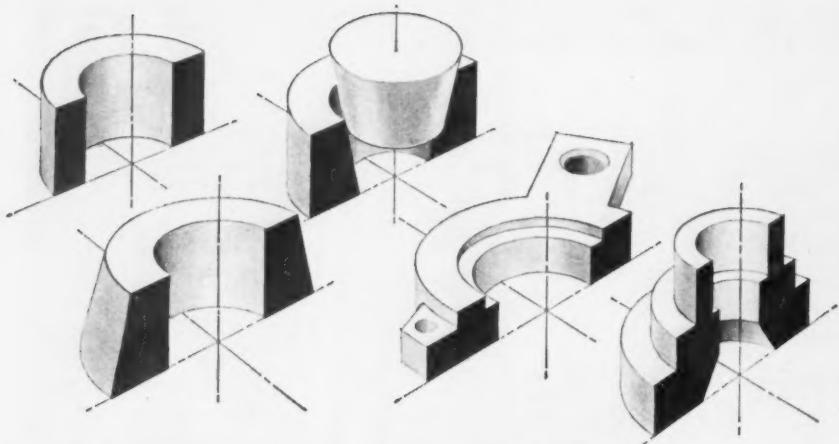


See LeBlond Booth 610
at the Machine Tool
Exposition in Chicago,
September 6-16.

For more data circle 349 on Postpaid Card

May, 1961

MODERN MACHINE SHOP 41



when to consider Vertical Grinding

A simple test you can try for yourself quickly determines whether you should consider the Springfield principle of vertical grinding. Try it!

CHECK YOUR ANSWERS TO THIS QUIZ

YES NO

- | | | |
|-------------------------------------------------------------|--------------------------|--------------------------|
| 1. Do you grind holes 4" in diameter and larger? | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Do you grind taper holes or mating parts? | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Do you grind on irregular shaped work? | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Do you grind O.D. or I.D. shoulders, offsets, undercuts? | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Do you grind pieces requiring extreme concentricity? | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Do you require a 5 micro-inch or better finish? | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Do some of your grinding jobs require many setups? | <input type="checkbox"/> | <input type="checkbox"/> |

If you answer yes to three or more questions, a Springfield vertical universal grinder probably can save real time and money in your plant. Mail the coupon today for your free and informative copy of "Vertical Universal Grinders"; Bulletin 197-F.

THE SPRINGFIELD MACHINE TOOL CO., SPRINGFIELD, OHIO



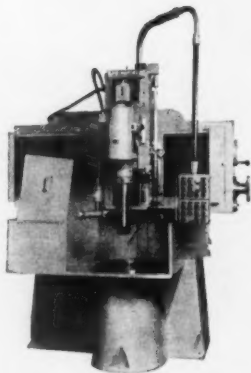
SPRINGFIELD

name & title _____

company _____

address _____

city, zone, state _____

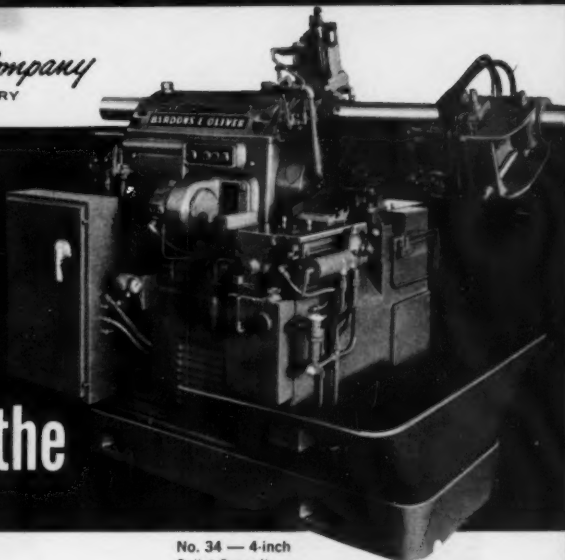


Above is a standard Springfield 2A-TR vertical universal grinder. It swings 25°; the grinding head has a 21" stroke and it grinds holes to a nominal depth of 18". The head can be tilted 45° in either direction. Electro-hydraulic control is standard with pendant pushbuttons. The Model 2A-TR costs less than most horizontal chucking grinders of comparable size; it can do the same work plus a wide variety of jobs that just can't be done on a horizontal. Gravity works for you in vertical grinding.

For more data circle 350 on Postpaid Card

at the Frank G. Hough Company
INTERNATIONAL HARVESTER SUBSIDIARY

Bardons & Oliver cutting-off lathe



No. 34 — 4-inch
Collet Capacity

slashes costs on job-shop operations

When an automatic machine enables cost reduction on both mass production and job-shop operations, it's of vital interest to management men. Such a machine is the No. 34 Bardons & Oliver Automatic Cutting-Off Lathe (shown below) busy at work for The Frank G. Hough Co. of Libertyville, Illinois, world famous builders of "PAYLOADER" tractor-shovels and "PAYMOVER" towing tractors.

Hough's methods engineer, Gerald Kannenberg wrote us:

"During the last ten months we've machined over 250 different parts on our new No. 34 B&O Cutting-Off Lathe. An analysis of five typical jobs (see chart) gives some idea of the substantial savings we're getting from this versatile machine. Our operators can economically run lot sizes as small as 50 pieces in our No. 34—and are doing it consistently.

For cut-off operations, we use higher speeds and heavier feeds with the B&O than on any other piece of equipment—and our men find the machine extremely easy to operate. Also, I want to thank you for the fine service and technical assistance we receive from Bardons & Oliver.

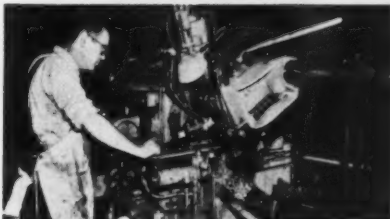
We are completely satisfied with the No. 34, and what's more important to us, the machine's production has met our highest expectations."

For the complete details on how Bardons & Oliver Cutting-Off Lathes can boost production and cut your costs, contact the Bardons & Oliver representative in your area or write directly to our main office.

Bardons & Oliver, Inc., 1133 West 9th St. • Cleveland 13, O.

Cost Comparison—Chamfer and Cut-Off Operations
(B & O Lathes vs. Conventional Methods)

Part Description		Cost Reduction
Bucket Link 2" diameter 17½" length AISI 1038		29%
Pivot Pin 1½" diameter 10½" length AISI 8625		22%
Steering Cylinder Tube 3" diameter 13½" length AISI 1022		25%
Locating Pin ½" diameter 2½" length AISI 1622		50%
Swivel Pin 1½" diameter 5½" length AISI 8625		27%

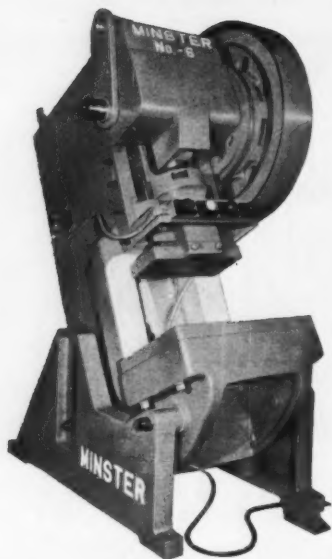


Chamfering and cutting-off 3-inch OD locating lugs at the Hough plant. High-speed steel tooling is being used at 160 SFPM — 0.0075-inch feed per cut-off tool.

BARDONS & OLIVER

For more data circle
351 on Postpaid Card

Manufacturers of Turret Lathes and Cutting-Off Lathes



TAKE A LONG, HARD LOOK

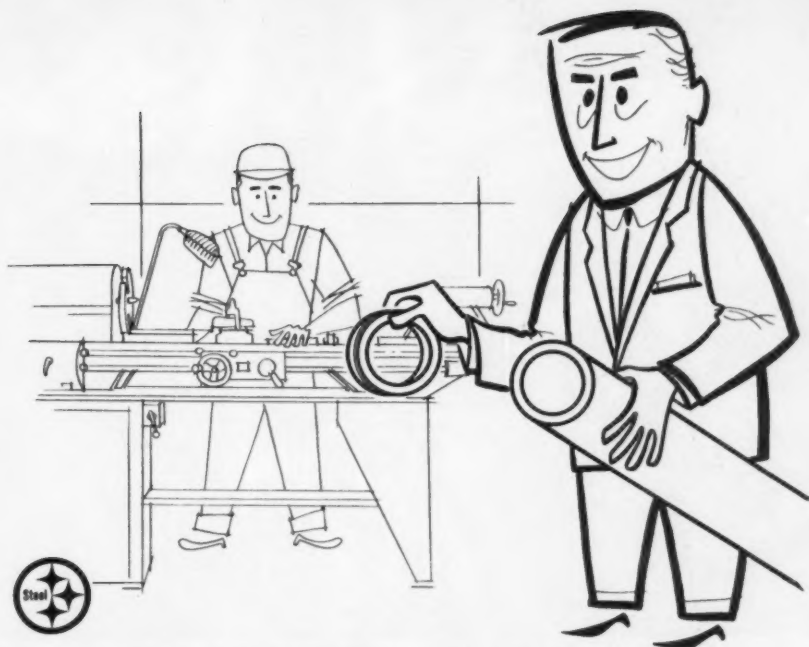
at the "hidden strengths and values" found only in a Minster O.B.I. press. Quality is not always visible at first glance. The fine points of design and construction which mean the difference between good performance and superior performance can easily be overlooked.

When evaluating O.B.I. presses, carefully compare clutches, slide areas, recirculating lubrication systems, and inclining mechanisms. On any size—16 through 250 tons—a Minster O.B.I. offers you more value for your money. Ask a Minster representative to prove it.

The Minster Machine Company, Minster, Ohio

MINSTER®

For more data circle 352 on Postpaid Card



YOU COME CLOSER TO FINISHED PRODUCT, REDUCE MACHINING TIME

when you specify **B&W Job-Matched Mechanical Tubing**

Do you consider tubing as a semi-finished product? It can be. In fact, when you start with the right B&W tube many end products require only finish machining—others need no machining at all.

Here's why. B&W seamless mechanical tubing is job-matched to your end-use application and production equipment. Desired finish, heat treatment, tolerances, alloy factor and steel quality are built into the tube to bring it as close as possible to the finished part. What's more, properties are uniform from tube to tube. You get fewer rejects—a more machinable tube in high-speed machining operations.

Interested? B&W mechanical tubing is available from Steel Service Centers around the country and through your B&W District Sales Office. Or write for Bulletin T-430. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pennsylvania.



TA-1011-M

B&W

THE BABCOCK & WILCOX COMPANY

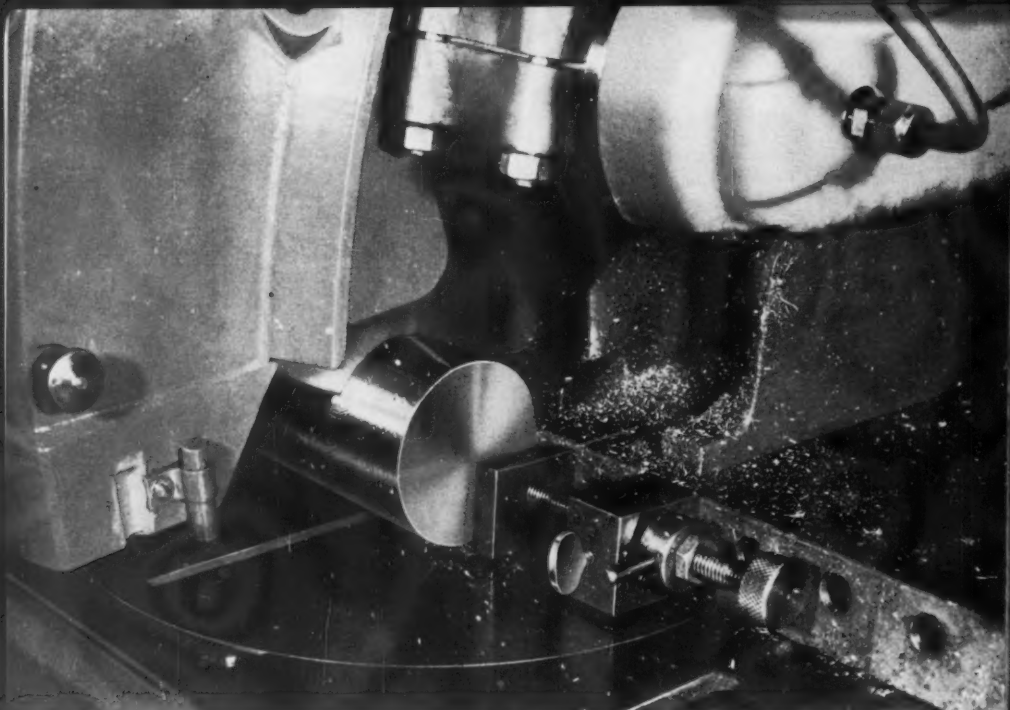
TUBULAR PRODUCTS DIVISION

Seamless and welded tubular products, solid extrusions, rolled rings, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels and special metals

For more data circle 353 on Postpaid Card

May, 1961

MODERN MACHINE SHOP 45



You can make \$356.85 do more — get DELTA'S NEW 12" Cut-Off Machine



Put the new Delta 12" Cut-Off Machine through its paces. Take a sample work piece to your Delta Distributor—cut it—judge this tool on results!

FREE BROCHURE: Write to Rockwell Manufacturing Co., Delta Power Tool Division, 606E N. Lexington Ave., Pittsburgh 8, Pa.

Here's a tool that will cut a square inch of steel in about four seconds—and do it all day long! At a low \$356.85*, it's a value you'll want to see for yourself. With a choice of 3 hp and 5 hp motors, you get the power to handle bar and tube stock up to $3\frac{1}{4}$ " in diameter, 3 x 3" angles, 4" channels, wood and plastic up to 2 x 8". You can equip for dry or wet abrasive cutting of a wide variety of materials at speeds above 12,000 sfpm.

You'll like these three exclusive features Delta offers: Retractable Size Gage, Hollow Arbor Mist Coolant and Replaceable Arbor. Your Delta Industrial Distributor will tell you more—he's in the Yellow Pages under **TOOLS or MACHINERY.**

**No. 20-111 complete machine less electricals.*

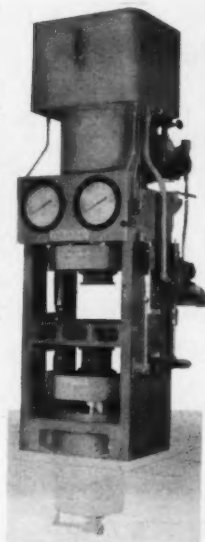


For more data circle 354 on Postpaid Card

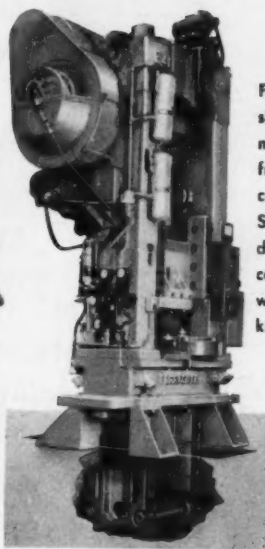
How to produce
POWDERED METAL PARTS
efficiently and economically...
from start . . . to finish



For initial
compacting of
powdered metals,
choose a hydraulic
from complete
range of tonnages
and sizes. 225-ton
double ram type
compacting press
illustrated.



For restriking and
sizing, select exact
mechanical size
from Ferracut's
complete line.
Shown—400-ton
double toggle
compacting press
with 100-ton lower
knockout.



Consult us on efficient methods of press production
of powdered metal components.

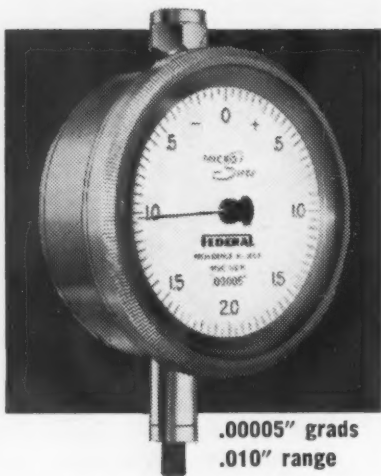
Since 1863

FERRACUTE MACHINE COMPANY

Builders of Power Presses and Special Machinery
Dept. C, Bridgeton, New Jersey, U. S. A.

For more data circle 355 on Postpaid Card

MICRO *Sure*... the completely *New*



DIAL INDICATOR

**MORE COMBINED ACCURACY
AND CONTINUOUS OPERAT-
ING RANGE**

... than any Electronic Gage

... than any Air Gage

AT A FRACTION OF THE COST!

No dimensional Indicator you have ever known can be compared to the MICRO-SURE Indicator because it represents an *entirely new concept* in Indicator design.

Get the whole story . . . write for brochure!

FEDERAL PRODUCTS CORP.

1145 Eddy Street, Providence 1, Rhode Island

Ask **FEDERAL**[®] First

for recommendations in modern gages . . . Dial Indicating • Air • Electric or Electronic — for inspecting, measuring, sorting, or automation gaging.

For more data circle 356 on Postpaid Card

PQA

proves it...

breaking point tests show
Allen screws are
consistently better

*PRODUCT QUALITY ASSURANCE

PQA is the symbol of unquestioned quality at Allen. It stands for constant quality control from rigid up-grading of incoming raw materials to final, *unconditionally guaranteed* shipment to you.

To give you some idea: Federal Spec. FF-S-86a calls for 4,950 lbs. for the 1/4-20 cap screw. Day-in, day-out breaking point tests of these screws prove that Allens are *consistently better* . . . well above the minimum requirement!

Quality checks like this one confirm PQA every step of the way through Allen's manufacturing process. And to help you keep costs down and profit margins up, Allen manufactures 1457 standard sizes.

Remember . . . it costs you no more to have *genuine* Allens right from stock, and they are only a minor fraction of your assembly costs.

ALLEN

MANUFACTURING COMPANY

HARTFORD 1, CONNECTICUT, U.S.A.

Plant at Bloomfield, Connecticut • Warehouses in Chicago, Cleveland and Los Angeles

For more data circle 357 on Postpaid Card



Genuine ALLEN products are available only through your ALLEN Distributor. He maintains complete stocks close by to help cut your freight costs, inventory, warehousing and handling. He offers fast, single-source service. He knows Allen products. And he makes Allen Engineering Service available to you any time. Call him!



*When You
Fabricate*



with

CLEVELAND PUNCHES and DIES

Made better to last longer, cut down-time!

Write for Folder PD #13

A-4559A

THE
CLEVELAND
PUNCH & SHEAR WORKS CO.
Established 1880

THE CLEVELAND PUNCH & SHEAR WORKS CO.

East 40th and St. Clair Ave., Cleveland 14, Ohio

Phone HEnderson 1-1911

Power Presses

Fabricating Tools

Punching Tools & Dies

For more data circle 358 on Postpaid Card

WHY WAIT?

SAVE THIS AD FOR CHECKING FUTURE REQUIREMENTS

DELIVERY FROM STOCK

**SPECIAL RH & LH
HIGH SPEED**

TAPS • DIES • THREAD PLUG & RING GAGES

NEW SIZES ADDED
DAILY... IF NOT
LISTED—
WRITE



DEALER
INQUIRIES INVITED

WHEN REQUESTING QUOTATIONS ALWAYS MENTION QUANTITIES								
SIZE	THREADS PER INCH		SIZE	THREADS PER INCH		SIZE	THREADS PER INCH	
0000	160		3/16	30-32-36-40-48-56-64-72		5/8	9-10-12-14-16-18-20-24-26-28-30-32-36-40-48-56-64	
000	120		1/8	24		3/4	27-28-30-32-36-40-48-56-64	
0	90-96-112		13/64	24-28-30-32-36-40		41/64	11-18-24-32	
1	56-64-72-80-90		7/32	20-22-24-26-28-30-32		21/32	10-11-18-20-24-27-32-40-48	
2	48-56-60-64-72-80-96		227	24		11/16	10-11-12-14-16-18-20-22-24-26-27-28-30-32-36-40	
3	36-40-44-48-56-60-64-72-80		15/64	20-22-24-28-32-36-40-48		23/32	11-12-16-18-20-24-27-32-36-40	
4	30-32-36-40-44-56-60-64-72-80-90		1/4	10-12-14-16-18-20-22-24-26-28-30-32-36-40		47/64	6-8-11-14-15-18-20-22-24-26-27-28-30-32-36-40	
5	22-27-30-32-36-38-42-48		17/64	40		5/4	10-12-16-18-20	
6	20-22-24-26-28-30-32-36-40		277	40		49/64	10-16-18-20	
7	18-20-22-24-26-28-30-32-36-40		9/32	16-18-20-24-26-27-28-32		25/32	10-12-16-18-20-24-27-32-40	
8	16-18-20-22-24-26-28-30-32-36-40		19/64	18-24		800	16	
9	14-16-18-20-22-24-26-28-30-32-36-40		300	32		13/16	8-10-12-14-16-18-20-24-27-32-40	
10	12-14-16-18-20-22-24-26-28-30-32-36-40		5/16	10-12-14-16-20-22-26-28-30-32-36-40-44-48-50-56-64		835	16	
11	10-12-14-16-18-20-22-24-26-28-30-32-36-40		21/64	16-18-20-24-36		6-12	8-10-12-14-16-18-20-24-27-32-40	
12	8-10-12-14-16-18-20-22-24-26-28-30-32-36-40		11/32	16-18-20-22-24-26-27-28-32-36-40-44		850	14	
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21	1-1/4-2-3-4-6-8-10-12-14-16-18-20-22-24-26-28-30-32-36-40		29/64	12-14-16-20-24-27-28-32		1-3/32	8-10-12-14-16-18-20-24-27-32-40	
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23	1-1/4-2-3-4-6-8-10-12-14-16-18-20-22-24-26-28-30-32-36-40		31/64	10-11-12-14-16-18-20-22-24-26-27-28-30-32-36-40-44-48-56-70-72-80		1-5/32	8-10-12-14-16-18-20-24-27-32-40	
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26	1-1/2-2-3-4-6-8-10-12-14-16-18-20-22-24-26-28-30-32-36-40		17/32	10-12-14-16-18-20-24-26-27-28-30-32-36-40		1-1/4	8-10-12-14-16-18-20-24-27-32-40	
27	1-1/4-2-3-4-6-8-10-12-14-16-18-20-22-24-26-28-30-32-36-40		550	24		1-5/16	6-7-8-10-12-14-16-18-20-24-27-32-40	
28	1-1/2-2-3-4-6-8-10-12-14-16-18-20-22-24-26-28-30-32-36-40		9/16	12-13-14-16-20-24-26-27-28-30-32-36-40-48-56-80		1-3/8	5-8-10-12-14-16-18-20-24-27-32-40	
29	1-1/4-2-3-4-6-8-10-12-14-16-18-20-22-24-26-28-30-32-36-40		37/64	10-12-18-20-27		1-1/2	12-16-20-32	
30	1-1/2-2-3-4-6-8-10-12-14-16-18-20-22-24-26-28-30-32-36-40		19/32	12-18-20-24-28-32-36-40		1-7/16	6-8-10-12-14-16-18-20-24-27-32-40	

LEFT HAND N.C. (USS) - N.F. (SAE) SIZES

SIZE	THREADS	SIZE	THREADS	SIZE	THREADS
0	80	8	32-36	7/16	14-20
1	64-72	9	24-28	1	1-1/8
2	56-64	10	20-24	1 1/2	12-18
3	48-56	11	18-24	1 3/4	10-14
4	36-40-48	12	16-24	1 7/8	8-12
5	30-32-36	13	14-20	2	6-12
6	24-30	14	12-18	2 1/2	6-12

'OVERSIZE' and 'UNDERSIZE' TAPS

MACHINE SCREW	±2 to ±5	Plus or Minus	.002, .003, .005
MACHINE SCREW	±6 to ±14	Plus or Minus	.005, .005, .010
FRACTIONAL	1/4" to 1-1/2"	Plus or Minus	.015, .015, .019

Right & Left Hand—Unlisted 'Gun' or Spiral Pointed Taps

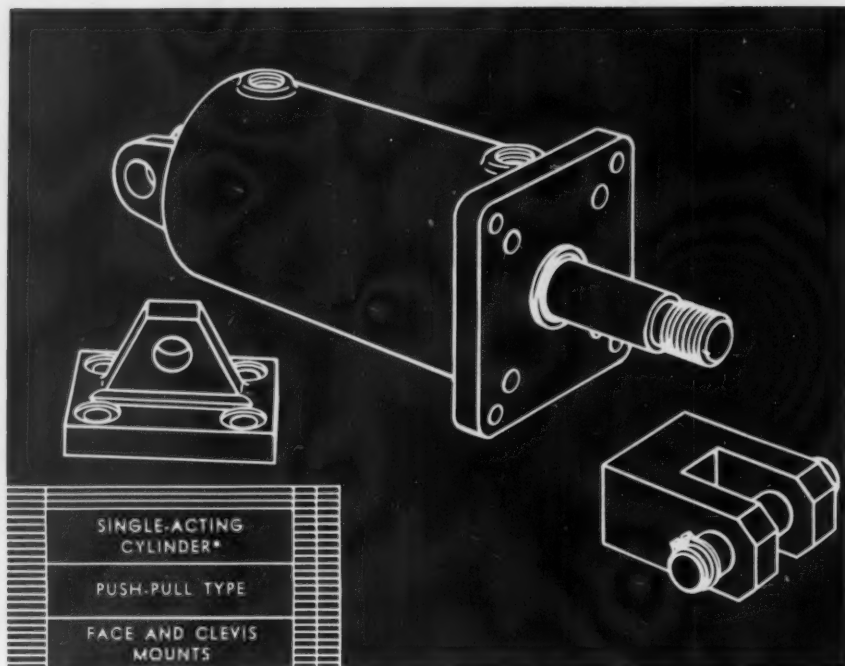
Size	Threads	Size	Threads
0	56 NC, 80 NF	7/8	9 NC, 14 NF
1	48 NC, 64 NF	1	8 NC, 12-14 NF
2	36 NC, 48 NF	1 1/8	7 NC, 12 NF
3	24 NC, 36 NF	1 1/4	6 NC, 12 NF
4	18 NC, 24 NF	1 3/8	5 NC, 12 NF
5	14 NC, 18 NF	1 1/2	4 NC, 12 NF
6	10 NC, 14 NF	1 3/4	3 NC, 12 NF

Right Hand—Unlisted 'Pulley' And Extra Length Taps

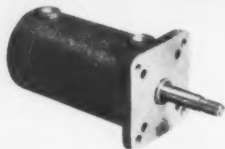
Size	Threads	Size	Threads
4	36-40 NC, 48 NF	3/8	24 NF
5	40 NC, 48 NF	7/16	20 NF
6	32 NC, 40 NF	1/2	20 NF
7	28 NC, 36 NF	9/16	12 NC
8	24 NC, 32 NF	5/8	18 NF
9	20 NC, 28 NF	3/4	16 NF
10	18 NC, 24 NF	7/8	14 NF
11	16 NC, 22 NF	1	12 NF
12	14 NC, 20 NF	1 1/8	10 NF
13	12 NC, 18 NF	1 1/4	8 NF
14	10 NC, 16 NF	1 3/8	6 NF
15	8 NC, 14 NF	1 1/2	4 NF
16	6 NC, 12 NF	1 3/4	3 NF
17	4 NC, 10 NF	1 7/8	2 NF
18	3 NC, 8 NF	2	1 NF
19	2 NC, 6 NF	2 1/2	1 NF
20	1 NC, 4 NF	3	1 NF

UNLISTED Right Hand 'Pipe' Taps

Taper	"NPT"	Size	Thread	"NPT"	Size	Thread
1	1/16	1	27	1	1/16	27
2	1/8	1	27	2	1/8	27
3	1/4	1	27	3	1/4	27
4	3/8	1	27	4	3/8	27
5	1/2	1	27	5	1/2	27
6	3/4	1	27	6	3/4	27
7	1	1	27	7	1	27
8	1 1/8	1	27	8	1 1/8	27
9	1 1/4	1	27	9	1 1/4	27
10	1 3/8	1	27	10	1 3/8	27
11	1 1/2	1	27	11	1 1/2	27
12	1 3/4	1	27	12	1 3/4	27
13	1 7/8	1	27	13	1 7/8	27
14	2	1	27	14	2	27
15	2 1/8	1	27	15	2 1/8	27
16	2 1/4	1	27	16	2 1/4	27
17	2 3/8	1	27	17	2 3/8	27
18	2 1/2	1	27	18	2 1/2	27
19	2 7/8	1	27	19	2 7/8	27
20	3	1	27	20	3	27
21	3 1/8	1	27	21	3 1/8	27
22	3 1/4	1	27	22	3 1/4	27
23	3 3/8	1	27	23	3 3/8	27
24	3 1/2	1	27	24	3 1/2	27
25	3 7/8	1	27	25	3 7/8	27
26	4	1	27	26	4	27
27	4 1/8	1	27	27	4 1/8	27
28	4 1/4	1	27	28	4 1/4	27
29	4 3/8	1	27	29	4 3/8	27
30	4 1/2	1	27	30	4 1/2	27
31	4 7/8	1	27	31	4 7/8	27
32	5	1	27	32	5	27
33	5 1/8	1	27	33	5 1/8	27
34	5 1/4	1	27	34	5 1/4	27
35	5 3/8	1	27	35	5 3/8	27
36	5 1/2	1	27	36	5 1/2	27
37	5 7/8	1	27	37	5 7/8	27
38	6	1	27	38	6	27
39	6 1/8	1	27	39	6 1/8	27
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41	6 3/8	1	27	41	6 3/8	27
42	6 1/2	1	27	42	6 1/2	27
43	6 7/8	1	27	43	6 7/8	27
44	7	1	27	44	7	27
45	7 1/8	1	27	45	7 1/8	27
46	7 1/4	1	27	46	7 1/4	27
47	7 3/8	1	27	47	7 3/8	27
48	7 1/2	1	27	48	7 1/2	27
49	7 7/8	1	27	49	7 7/8	27
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52	8 1/4	1	27	52	8 1/4	27
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88	14 1/4	1	27	88	14 1/4	27
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206	34	1	27	206	34	27
207	34 1/8	1	27	207	34 1/8	27
208	34 1/4	1	27	208	34 1/4	27
209	34 3/8	1	27	209	34 3/8	27
210</						



New MEAD single - acting cylinder can *PUSH* or *PULL*



Design Advantages

- Pressure tightening seals throughout.
- Conical return spring assures long life and uniform tension.
- Return spring recessed in cover for compactness.
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- Full floating double-up piston cup for extended life.

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*May be used as double-acting cylinder if desired.

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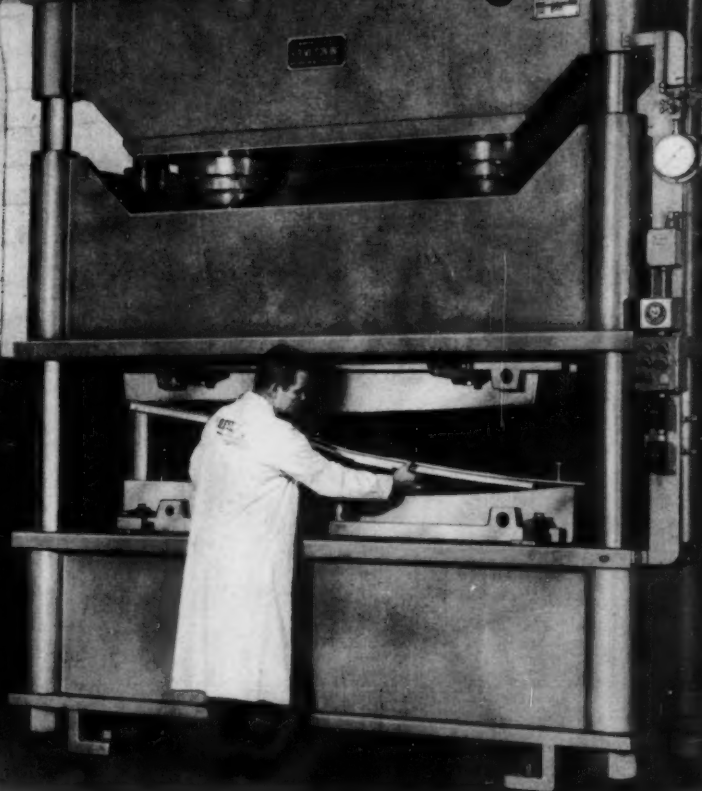
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For detailed information and specifications, write for Bulletin 95-D. K. R. Wilson, Inc., 216 Main St., Arcade, N. Y.

KRW HYDRAULIC PRESSES

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More Profitable Bending REPORTED FROM INCREASED PRODUCTION, BROADER FLEXIBILITY, FASTER SETUP...

... ON NEW PINES HIGH SPEED MODEL 3-T PRESS. This new progressive bending press has proven the key to increased production, reduced costs on a variety of jobs in such industries as automotive, furniture, appliance, and farm equipment.

"INCREASED PRODUCTION"... reported by Bunting Co., Inc., Philadelphia. Accurate, quality bends are produced on the 3-T three times faster than by conventional methods. Speeds up to 1500 bends an hour on tubular parts up to 1" O.D.

"BROADER FLEXIBILITY"... says Kalamazoo Furniture Company, Kalamazoo, Michigan. Wide open tooling area permits rapid progressive bending in varied planes. Up to 10 different bend angles are automatically produced in a single setup with maintained plus or minus 1/2 degree accuracy.

"FASTER SETUP"... reported by Configured Tube Products, Bellwood, Illinois. Pick-out pins in indexing turret permit quick bend angle selection, are easily stored with stop gauges for repeat work. Quick change tooling contributes to fast, 15 minute setups.

... ON MODEL 6-T PRESS. At Chromcraft Corporation, St. Louis, this multiple bending press saves time simultaneously forming "U" frames in two and three tubes per cycle at speeds up to 2000 bends an hour.

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May, 1961

MODERN MACHINE SHOP 55



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The better design of Fellows cutters is the result of advanced engineering techniques, including the use of a high-speed computer for solving design and application problems. Their better quality is the result of constant advances in metallurgy and manufacturing methods. And, proof of their better performance are the thousands of Fellows cutters in use on modern gear production lines.

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58 MODERN MACHINE SHOP

May, 1961

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***INVARO OIL-HARDENING** — Safety in hardening, long life, uniform surface and core hardness. Easy to machine, simple and safe to heat treat, resists deformation. Perfect for intricate tools and dies.

AIRVAN AIR-HARDENING — Superior toughness and high abrasion resistance for long production runs. Excellent non-deforming properties.

LOW CARBON — Low in cost . . . perfect for parts requiring accurate dimensions but not hardened tool steel. May be case hardened conventionally.

**The Invaro Twins—oil-hardening drill rod and ground flat stock—possess the same uniform physical and chemical properties . . . may be heat treated simultaneously for consistent hardening results . . . deliver uniform maximum production when used together.*

***INVARO OIL-HARDENING** — Non-shrinking . . . resists warping and dimensional change in heat treatment. Ideal for intricate work where safety in hardening, uniformity of results and long life are important.

STERLING "V" WATER-HARDENING — Carbon-vanadium tool steel . . . for uses requiring a good cutting edge, a hard surface and maximum toughness. Well suited for shops not equipped for accurate heat treating.

COMMERCIAL — For general and miscellaneous use . . . accurate in size, with good machining properties. Useable in annealed state . . . or may be hardened for greater strength and wear resistance.

PIONEER IN POWDER AND MOLTEN METALLURGY



Firth Sterling
— INC —

3113 Forbes Ave., Pittsburgh 30, Pa.
Offices and warehouses in principal cities

For more data circle 367 on Postpaid Card



Let's talk about YOUR precision measurement problem!

Do you need fast, accurate measurements to a "tenth" or better? Some contour, an angle? Or odd-shaped small parts that have to meet tight tolerances in *all* dimensions?

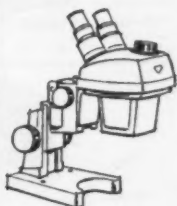
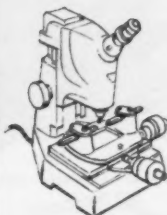
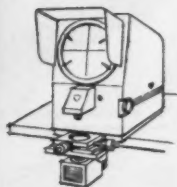
Maybe all you need is a reticle in an eyepiece of our popular new StereoZoom® Microscope. Or the critical accuracy of our Toolmakers' Measuring Microscope. Or perhaps our Bench Comparator, for the dual capability of measurement *and* silhouette comparison. Or—but why just guess about it?

We have a complete line of optical measuring instruments ready to help you. More than that, we'll be glad to suggest the equipment that will do the job best, at lowest cost. No obligation, of course. Just drop the coupon in the mail today and let our experts brain-storm your problem.

BAUSCH & LOMB



Made in America, to the world's highest standard.



BAUSCH & LOMB INCORPORATED
89317 Bausch St., Rochester 2, N. Y.

My measuring problem is

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Please advise, with no obligation on my part.

NAME, TITLE

COMPANY

ADDRESS

CITY ZONE STATE

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STANDARD ELECTRIC CHUCKS



LONG AND
TRANSVERSE
BAR POLE CHUCKS



VACUUM CHUCKS



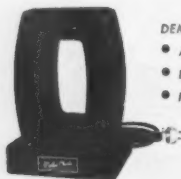
CERAMAX
PERMANENT MAGNETIC



CERAMAX
ROTARY
CHUCKS



ROTARY
ELECTRIC
CHUCKS



DEMAGNETIZERS

- APERTURE
- PLATE TYPE
- PORTABLE

Walker --- with **EVERYTHING**

Stop at the Walker Booth (No. 2418) to see first hand the wide selection of magnetic chucks and other magnetic holding devices Walker has available for the metal working industry. You'll see the new Walker Electroperm Chuck, which combines permanent magnets and electric coils to permit holding large ferrous workpieces without heat distortion; the new Walker Ceramax Chucks, the new Walker Top Plate that gives wider latitude to sizes of workpieces that can be worked on Ceramax Chucks — also, the new Walker low frequency Demagnetizer that permits deeper penetration into large workpieces such as engine heads and die blocks. These, as well as many standard Walker Chucks and demagnetizers will be on display. Even if your requirements don't fall within Walker's standard product applications, a Walker representative or engineer will be on hand to explain how Walker has solved hundreds of special magnetic holding problems and can help you, too. In fact . . . it's a good bet that at Walker's booth you'll find the perfect answer to any magnetic holding problem you have.



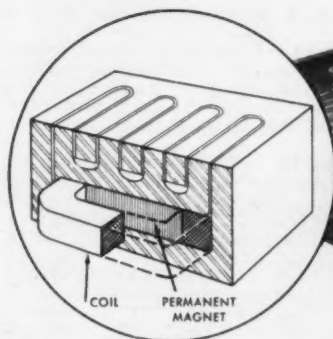
SPECIAL CHUCKS FOR
SPECIAL APPLICATIONS

Catalogs and other descriptive literature will be available.

O.S. Walker
COMPANY, INC.
ROCKDALE ST., WORCESTER, MASS.



will be at the **ASTME SHOW** **BOOTH 2418** for **MAGNETIC HOLDING!**



New **COLD OPERATING** **ELECTROPERM CHUCK**

For the first time, a cold operating magnetic chuck is available in all larger standard sizes up to 42" x 96".

Because the new Electroperm Chuck operates cold, precise dimensional stability is main-

tained. The chuck will hold the precision of the machine tool. The chuck is only energized and de-energized electrically, but the permanent magnets provide the holding power. Heat is eliminated.

New - TOP PLATE FOR CERAMAX CHUCKS

Features intermediary magnetic poles to make gap divisions finer. $\frac{1}{8}$ " poles added permits secure holding of

thin work pieces as small as $\frac{1}{8}$ " in diameter. Retention of $\frac{1}{4}$ " poles provide maximum holding for larger pieces.

**SEE ALSO AT WALKER'S BOOTH
THESE FAMOUS BUX PRODUCTS:**



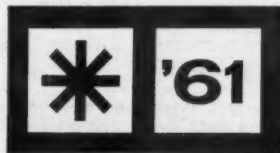
**Fast Radial Positioner
for Bux Portable Magnetic
Drill Press**

**Permanent
Lifting
Magnets**



O.S. Walker

COMPANY, INC.
ROCKDALE ST., WORCESTER, MASS.



For more data circle 369 on Postpaid Card

When Any Way of CUTTING KEYWAYS

but

Minute Man[®]
Costs Too Much



Minute Man Keyway Broach Kit

Instead of setting up a big machine tool for the small but constantly necessary jobs of cutting keyways in gear, hubs, milling, cutters, etc., you can do it, by hand, with an arbor press, in *one minute* for as little as *one cent* with Minute Man Keyway Broaches and Kits. For keyways from $\frac{1}{16}$ " to 1" in any bore from $\frac{1}{4}$ " to 3.

4 Minute Man Keyway Broach

Save Time with Standard Stock SQUARE BROACHES

$\frac{1}{8}$ " to 1" holes (32nd sizes, too)



The duMont Corp., Greenfield, Mass.

MAIL FREE BROACH CATALOG AND
PRICE LIST S describing Square, Hexagon
Broaches, Production Type Keyway Broaches
and Keyway Broach Kits to

Name.....

Company.....

Address.....

duMont

Booth No. 3215, ASTME Show, N.Y. Coliseum, May 22-26
For more data circle 370 on Postpaid Card

64 MODERN MACHINE SHOP

Meetings

Important Meeting Dates

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

MAY 8-12 • American Foundrymen's Society, Annual Convention and Exhibit, Brooks Hall and Civic Auditorium, San Francisco. Society headquarters: Golf and Wolf Rds., Des Plaines, Illinois.

MAY 15-18 • Machinery Dealers National Association, Annual Convention, Shoreham Hotel, Washington. Association headquarters: 1346 Connecticut Ave., N.W., Washington, D. C.

MAY 21-24 • Magnesium Association, Annual Meeting, The Greenbrier, White Sulphur Springs, W. Va. Association headquarters: 122 E. 42nd St., New York, New York.

MAY 22-25 • American Society of Mechanical Engineers, Design Engineering Conference and Show, Cobo Hall, Detroit. Society headquarters: 29 W. 39th St., New York 18, New York.

MAY 22-26 • American Society of Tool and Manufacturing Engineers, Annual Convention and Exhibit, Statler-Hilton Hotel and Coliseum, New York. Society headquarters: 10700 Puritan Ave., Detroit 38, Michigan.

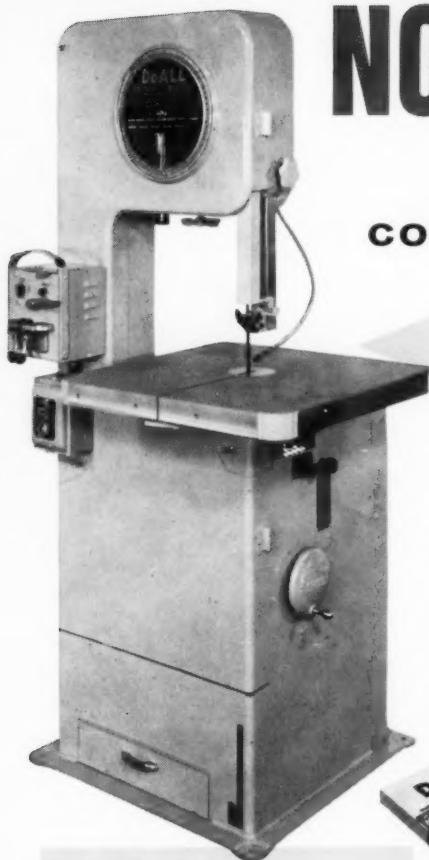
MAY 23-26 • American Supply and Machinery Manufacturing Association, Incorporated, Triple Industrial Supply Convention, Atlantic City, N. J. Association headquarters: 2031 Keith Building, Cleveland, Ohio.

MAY 23-26 • Anti-Friction Bearing Manufacturers Association, Incorporated, Annual Meeting, Sea View Country Club, Absecon, N. J. Association headquarters: 60 E. 42nd St., New York, New York.

MAY 24-25 • American Iron & Steel Institute, Annual Meeting, Waldorf-Astoria Hotel, New York. Institute headquarters: 150 E. 42nd St., New York 17, New York.

MAY 24-26 • Electronic Industries Association, Annual Convention, Pick-Congress Hotel, Chicago. Association headquarters: 1721 DeSales St., N.W., Washington 6, D. C.

May, 1961



UTILITY MODEL 1612-U

offers 16" throat and 12" thickness capacity.

A larger Model 3012-U has 30" throat and 12" thickness capacity. Both machines have all-welded box frame construction; No. 10 butt welder; high-speed insert-type guides for band widths from $\frac{1}{4}$ " to $\frac{1}{2}$ ", and other top-quality features. Both Model 1612-U and Model 3012-U are guaranteed by DoALL, world's leader in band sawing machines and band tools.

NOW — OWN A GENUINE **DoALL** CONTOUR MACHINE

ONLY
\$995

New blades and wider speed range make it more versatile, more productive

It's a multi-purpose UTILITY machine with all the quality and operating features to make it the industry's outstanding buy. A real DoALL in every sense of the word. And a "must" for toolrooms, job shops, sheet metal, maintenance shops, etc.

Designed to take advantage of the increased cutting ability of the new Dart® blades, it has a wider speed range extending up to 5200 fpm. New heavy-duty drive assures smooth contour sawing of all machinable materials, and dependable accuracy under the heaviest cuts.

With a full line of accessories and attachments, you can handle a tremendous variety of work in metal sawing, filing and polishing as well as light gage friction cutting. Also for cutting plastics, fibrous materials, etc.

It's the kind of machine that starts earning money for you the day you install it. Call your local DoALL Sales-Service store today for a demonstration.



USES THIS NEW DART® BLADE

The Utility machine is capable of using the new Dart blade, which is guaranteed to outperform any make of carbon steel saw band. Specialized heat-treatment gives it a spring-tempered back and full, hard cutting edge. Custom-welded to length with DoALL's exclusive process—guarantees strongest weld made and perfectly matched teeth. Set is guaranteed to within $\pm .002$ ".

See it at ASTME Show, Booth 2222 New York Coliseum — May

8-66



This is a typical DoALL Store

The DoALL Company, Des Plaines, Illinois

Call Your DoALL Sales-Service Store



MACHINES AND BLADES



SURFACE GRINDERS



POWER SAWS



CUTTING TOOLS



MEASURING INSTRUMENTS



GRANITE PLATES



SHOP

For more data circle 371 on Postpaid Card

May, 1961

MODERN MACHINE SHOP 65



***Time
is the
measure of
productivity***



Reduce grinding time and you increase productivity. Norton's many time saving innovations in varied stages of grinding production can reduce your grinding time up to 30%! The story is a profitable one. Here's why —

Norton Grinding Machines are engineered to permit higher wheel speeds to reduce cutting time. Norton's *Automatic Wheel Balancer* balances the wheel in *five seconds — on the machine*. You reduce time spent "grinding air" up to 85% because of Norton's *Automatic Wheel Contact Accelerator* which speeds the wheel to the work and compensates for work piece-diameter variation. Another advance is Norton's *Automatic Truing* which eliminates work interruptions and the *Automatic Wheel Wear Compensator* that stabilizes the grinding cycle.

Norton Grinders further add to your productivity by minimizing work spoilage with *Automatic In-Process Gaging*. In the case of surface grinders Norton *Higher Table Speed of 150 fpm* actually reduces grinding time up to 50%.

These are only some of the many reasons you can increase your productivity with Norton Grinders. They also offer accessories that literally transfer skills to machines — *ultra-fine feed*, and *automatic features* such as *steady resting*, *endwise locating*, *loading*, *constant peripheral wheel speed* and *hydraulically operated feed screws* provide this competitive advantage.

The decision is yours — can you afford not to reduce the time it takes to produce your product? Can you afford not to increase your productivity? Contact your Norton man, NORTON COMPANY, Machine Tool Division, Worcester 6, Mass. District Offices: Worcester, Hartford, Cleveland, Chicago, Detroit. In Canada: J. H. Ryder Machinery Co. Ltd., Toronto 5.



MACHINE TOOLS

*... Making better products
to make your products better*

MACHINE TOOL DIVISION: Grinding and Lapping Machines — **G & E DIVISION:** Shapers • Gear Cutting Machines
For more data circle 372 on Postpaid Card

May, 1961

MODERN MACHINE SHOP 67



*You Make Your Own
Engraved Nameplates!*

- ELIMINATE DELAYS!
- KEEP YOUR OPERATING COSTS WHERE THEY SHOULD BE!



PORTABLE 40-POUND BENCH MODEL 106

Here is a speedy, economical 2 or 3-dimensional engraver used by thousands of dollar-conscious companies. It features 5 positive, accurate pantographic ratios; ball bearing spindle with 3 speeds up to 14,000 rpm. Is supplied with one copy carrier that accepts all standard master type sizes. Will actually work up to 10" by any width. Height of pantograph and position of cutter are continuously adjustable.

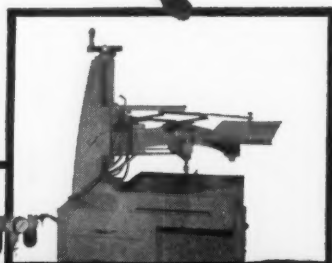
MODEL D-2 HEAVY-DUTY 2-DIMENSIONAL

Pantograph for milling,
drilling and engraving.

Vertical adjustment of copy table automatic with Pantograph. Features: unobstructed on 3 sides to take large work; micrometer adjustment for depth of cut; ball bearing construction throughout; spindle speeds up to 26,000 rpm for engraving or machining; vertical range over 10"; ratios 2 to 1 to infinity — master copy area 26" x 10"



*Write or call for full
details and prices.*



NEW MODEL D2-201 PNEUMATIC ATTACHMENT

for use with Model D2 Pantograph Engraver to rapidly drill holes in printed circuits by tracing templates. Drills as many as 100 holes per minute. Equipped with foot switch; spindle air cylinder; regulating valve and pressure gauge; filter and oiler. It's ready to use as soon as it's attached to an air compressor.

GREEN INSTRUMENT COMPANY, INC.

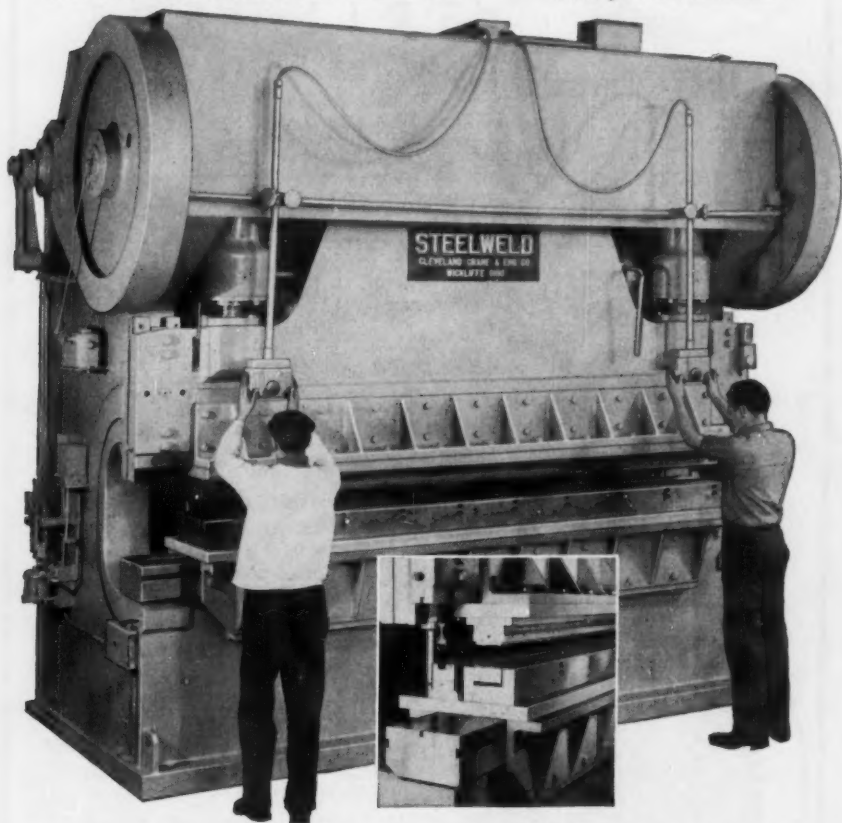
Dept. 92, 295 Vassar St., Cambridge 39, Mass. Tel. Eliot 4-2989

For more data circle 373 on Postpaid Card

STEELWELD PRESS BRAKE

CUTS FORMING COSTS

Fast Two-Step Operation Speeds
Trolley Duct Production



ELECTRIC trolley duct is turned out at a high rate on a Model K5-10 Steelweld Brake. The machine is fitted with removable bed and ram brackets to provide the width necessary to support two sets of dies. The front dies flange both sides of steel strips. The rear dies form the flanged strips into ducts. Thus, with each stroke of the ram, two operations are performed and a trolley duct completed. As many as 20 ducts can be produced per minute, which is the speed of the machine.

Two men normally work at the press, and each is provided with a set of control buttons. As a safety measure, two "run" buttons,

requiring both hands of the two men, must be depressed to operate the machine.

This machine has air-electric control which eliminates the need of any cross shafting at front for mechanical foot treadles. Air-electric control makes push-button operation possible and provides fast, positive clutch and brake action.

Write for free copy of catalog No. 2023A

STEELWELD

Mechanical and Hydraulic
PRESS BRAKES

Steelweld Machinery includes: Mechanical & Hydraulic Shears and Press Brakes, One-, Two- and Four-Point Straight-Side Presses, Speed-Draw Presses.



STEELWELD MACHINERY DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 6472 E. 281 ST. • WICKLIFFE, OHIO
For more data circle 374 on Postpaid Card

May, 1961

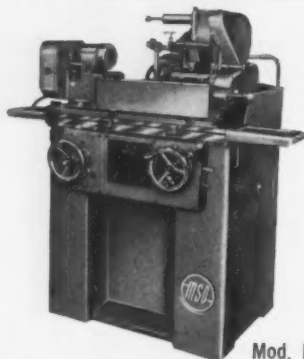
MODERN MACHINE SHOP 69

established 1865



GRINDERS

**the ultimate in
PRECISION — SPEED — EASE**



Universal Grinders, FM Series.

Here are **true** Universal Grinders with all the versatility the name implies.

Check these features:

Compound swivel of wheelhead;

Extreme sensitivity —

wheelhead moves on precision rollers;

Single-tooth in-feed to .000050";

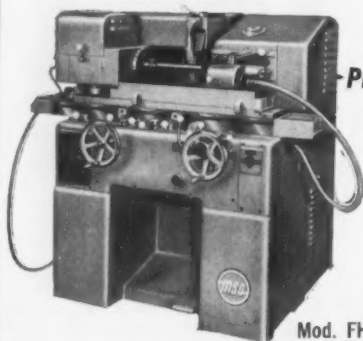
For O.D. and I.D. grinding;

Manual or power feeds;

Swing: 7" and 10"

Grinding lengths: 12", 20", 30", 40"

Mod. FMES 7" x 12"



Production Grinders, FH Series.

For automatic push button grinding —
cylindrical, profile, taper to precise
limits — fine finish;

Preselected automatic cycles for traverse
or plunge grinding — straight or angular;

Patented positive stop guarantees repeat
accuracy to .000040";

Available with electric or electronic
sizing gauge, match grinding unit,
automatic wheel dressing;

Swing: 7", 10", 13 $\frac{3}{4}$ " and 16"

Grinding lengths: 12", 16", 30",

40", 60", 80"

Mod. FH-200 10" x 16"

WHY SETTLE FOR LESS — CHECK MSO FIRST

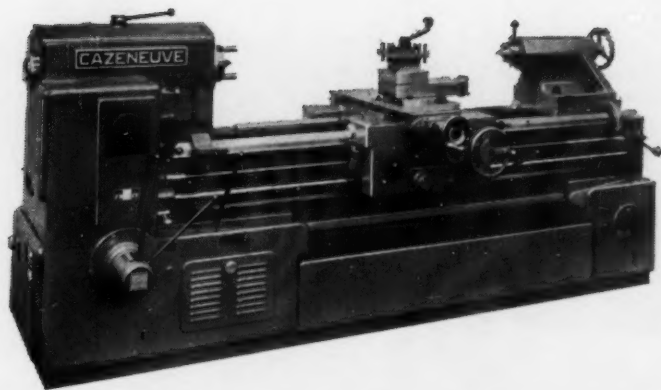
MSO also builds Cylindrical Grinders up to 22" x 138" Thread Grinders, Optical Jig Boreers

@ austin industrial corporation

76-H Mamaroneck Avenue

White Plains, New York

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NOW HIGH QUALITY, PRECISION, DOUBLE PURPOSE LATHES

Cazeneuve specializes exclusively in the design and construction of high quality lathes. The superior craftsmanship reflected in each Cazeneuve Lathe is known and respected the world over.

The design which has contributed to the Cazeneuve reputation, permits optimum accuracy in both tool room and production line applications. The Cazeneuve Lathe removes metal with high precision on a wide range of jobs with the speed and ease that increases efficiency to its maximum—reduces operator fatigue to a minimum.

Here are just a few outstanding features:

- TRACER ATTACHMENT repeats within .0004". TAPER ATTACHMENT also available.
- Patented 4 way tool turrets are accurate to .0005 inches.
- All shafts are mounted on anti-friction bearings.
- Ground lead and cross feed screws.
- All moving parts are automatically pressure lubricated.
- Diagonal bridging bed construction.
- Induction hardened ways and gears.

Write, phone or wire for complete specifications

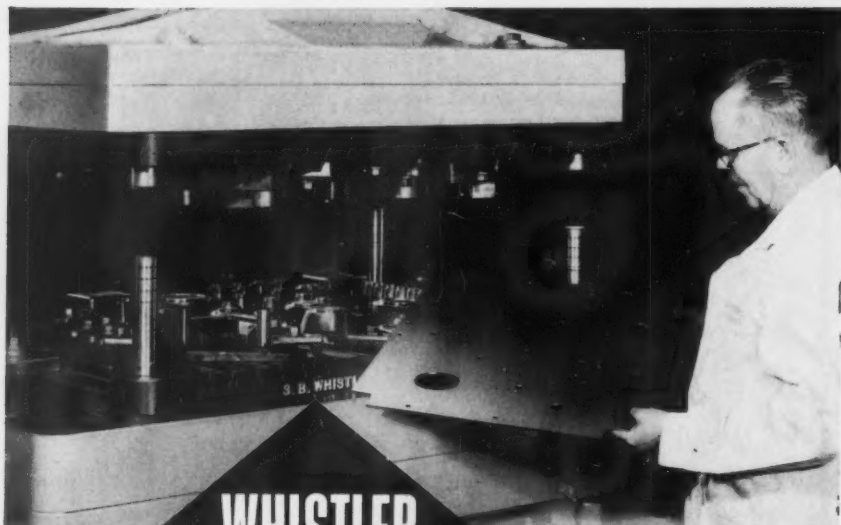
CAZENEUVE

LATHES, INC.

549 E. LINDEN AVENUE, LINDEN, N. J. • WA 5-4940

See the Cazeneuve Lathe in action at the Tool Show May 22 thru 26. Booth No. 1328

For more data circle 376 on Postpaid Card



WHISTLER ADJUSTABLE DIES

For Perforating and
Notching Materials
up thru $\frac{1}{4}$ " Mild Steel

**save
thousands \$\$\$
in tooling costs**

Interchangeable punch and die parts are readily arranged on Tee-Slot die sets. The same parts can be used again and again in different groupings. You profit in numerous ways:

- Even new workers can quickly learn to make pattern changes.
- Tooling costs cut to rock bottom.
- Precise accuracy assured.
- Punches and dies stocked in .001" increments from .100" to .500" diameters. Larger sizes in stock up to 3"

S. B. WHISTLER & SONS, INC.
740 Military Road, Buffalo 23, N. Y.

MAIL the following:

☐ Adjustable
Die Catalog

☐ Magna-Die
Catalog

☐ Custom Die
Bulletin

NAME

TITLE

COMPANY

STREET

CITY

ZONE

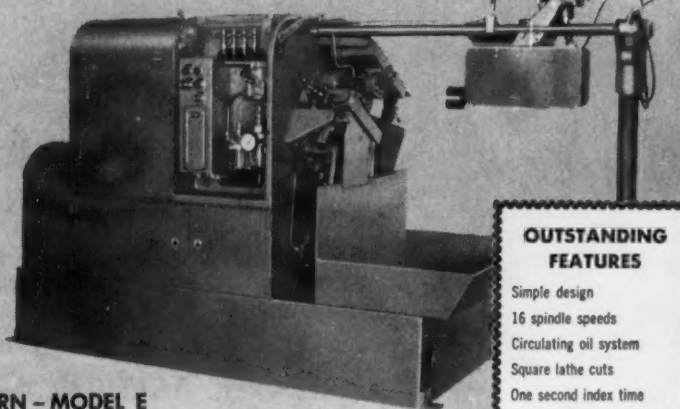
STATE

For more data circle 377 on Postpaid Card

**GET THE TIME
AND MONEY
SAVING STORY
ON WHISTLER
PRODUCTS:**

magnetic dies
adjustable dies
custom dies

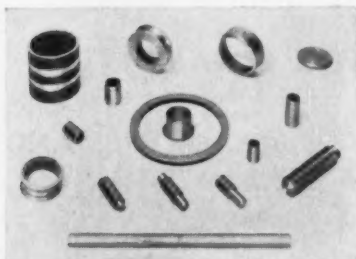
HIGH SPEED, AUTOMATIC CUTTING-OFF MACHINES



MODERN - MODEL E

Increase production, lower costs and cut any material that can be turned — bar stock up to 3" O. D. — tubing up to 8" O. D., to lengths from a fraction of an inch to several feet, with micrometer accuracy. Ideal for use with carbide tools.

We also engineer and build machines — using the same bodies and spindles — for such operations as trimming ends of drawn shells and filler caps. Send prints for quotes.

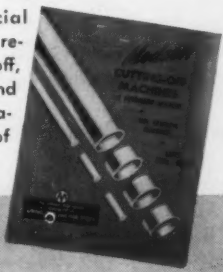


We can furnish special tooling to meet your requirements — to cut-off, form, groove, flange and chamfer in a single operation, at a high rate of speed. Send prints.

OUTSTANDING FEATURES

- Simple design
- 16 spindle speeds
- Circulating oil system
- Square lathe cuts
- One second index time
- Fast set-up change — from one diameter and length to another. Any tool can be changed without disturbing others.
- All cams, adjustments and working parts for cross slide are outside for quick, easy adjustment.
- Chip pan slides out, for easy dumping.
- Power, speed and rigidity for cast alloy and carbide blades.
- Special spindle bearing takes all collet thrust. No thrust on main taper roller spindle bearings.

Catalog and production figures mailed on request.

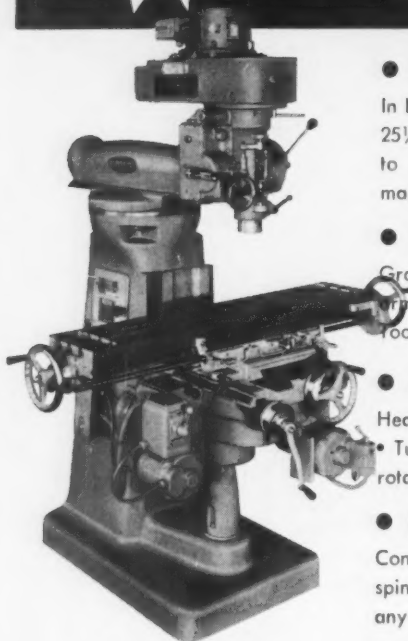


MODERN MACHINE TOOL COMPANY
2005 Losey Street • Jackson, Michigan

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"645" BETTER SIX WAYS



• GREATER RANGE—

In EVERY category than ANY machine in its class • $25\frac{1}{2}$ " of ram travel • Spindle to table and spindle to column—Range greatly exceeds competitive machines, PLUS many other dimension advantages.

• GREATER ACCURACY—

Ground lead screws • Hand scraped ways • Over-run stays in one plane • Locks without distortion • Tool room accuracy in manufacture of components.

• GREATER VERSATILITY—

Head tilts 45° forward and back, rotates 360° on ram • Turret rotates 360° on column • Power assembly rotates 360° around spindle • Many other features.

• GREATER EFFICIENCY—

Convenient controls • 9 spindle speeds, 3 power spindle feeds (up or down) • 4-way head handles any compound work angle • Greater work area.

• GREATER DURABILITY—

Index quality throughout for long trouble-free life.

• PROVEN ACCESSORIES AND EXTRA EQUIPMENT—

Ask for catalog and prices.

**WRITE FOR YOUR COPIES OF 4-PAGE
DESCRIPTIVE BROCHURES PACKED
WITH FACTS ON NEW MODEL "645"
HEAVY DUTY "55" VERTICAL MILL
AND
MODEL "60" HORIZONTAL MILL.**

INDEX

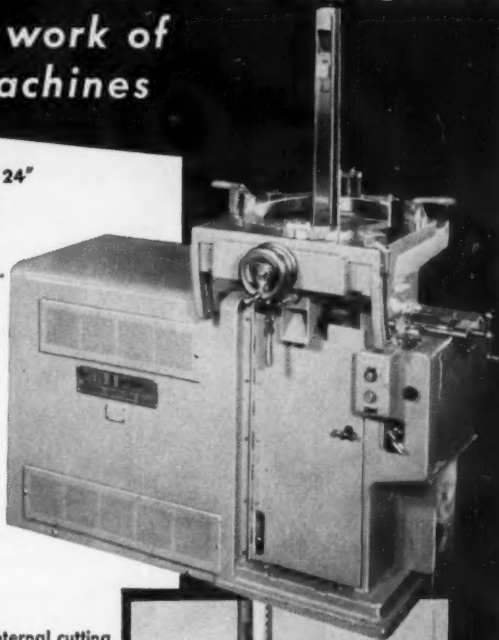
**MACHINE COMPANY
544 N. MECHANIC ST.
PHONE ST 2-6737
JACKSON, MICHIGAN**

For more data circle 379 on Postpaid Card

AMAZING NEW **M&M** KEYSEATER HYDRAULIC AND VERTICAL CUTTING MACHINE

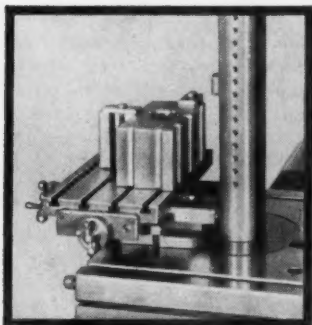
*does the work of
many machines*

In addition to a keyseater that cuts internal keyways up to 3" wide x 24" long, the new hydraulic M & M is a handy tool room machine and can be easily adapted to special production jobs other than keyways. A wide variety of internal or external cuts, serrations, grooves and teeth can be rapidly made on this machine. With a combination tilting table and index table (shown on machine at right) straight or tapered bores and accurately spaced multiple keyways or splines may be cut at any degree of the circle. Send us prints of your cutting problems.

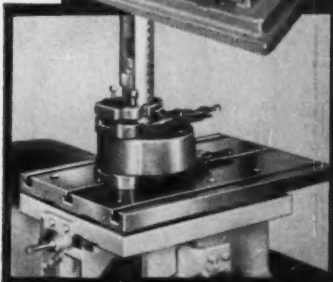


Right: Set-up for internal cutting

Below: Set-up for external cutting



106



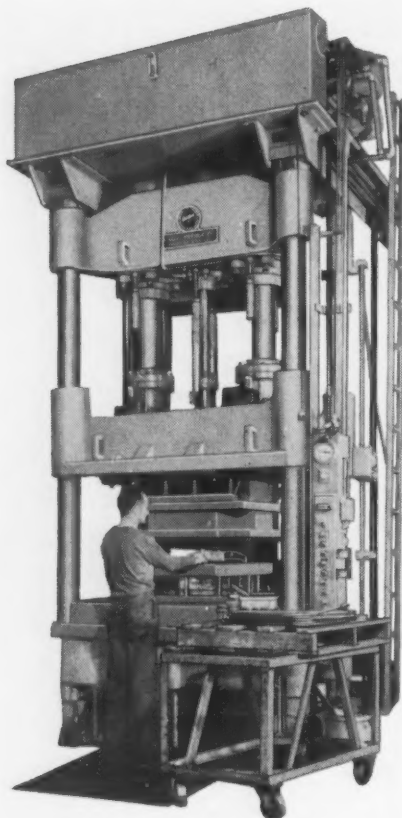
BUILDERS OF MACHINERY
SINCE 1854

M&M KEYSEATERS AND
VERTICAL CUTTING MACHINES

MITTS & MERRILL • 1006 So. Water St. • SAGINAW, MICHIGAN

For more data circle 380 on Postpaid Card

**You get greater accuracy and speed
with**



Good Idea! Write today for complete information on RODGERS Metal Working and Drawing Presses, together with convenient chart showing how easy it is to "design your own." Ask for new Catalog 337.

1. You get shock-proof operation with RODGERS exclusive decompression circuit, which gives longer life to hydraulic components, greater accuracy on continuous runs, and faster production.
2. You get the advantage of RODGERS positive-pressure Check Valve, which maintains even pressure in the hydraulic circuit, eliminates excess demand on pump, assures smoother operation and longer machine life.
3. You have a choice of hydraulic circuits, including manual, pressure-sensitive, semi-automatic, or fully automatic control, to give you any desired speed and performance.
4. You have a choice of press frames and platens, in cast alloy steel, ductile cast iron, or fabricated weldments — to suit your requirements.
5. With RODGERS flexibility of design, you may select the exact type metal-working press you prefer for any particular need. Simply specify the capacity, from 50 to 400 tons; the size bed frame, with solid or open bolster; the pump unit and controls needed to give you any desired speed. Actually, you may *design your own press* from the convenient specification tables which we will send you upon request.

HP-100DR

RODGERS HYDRAULIC, INC.

7401 Walker Street • Minneapolis 26, Minnesota

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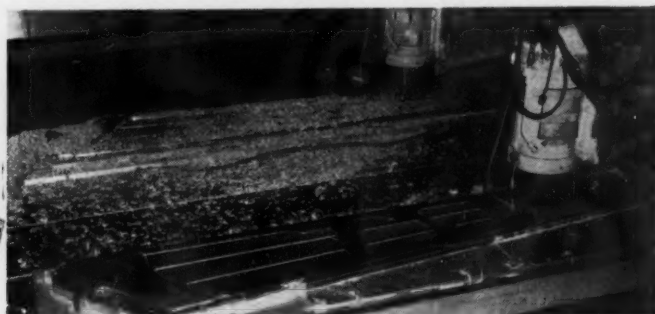
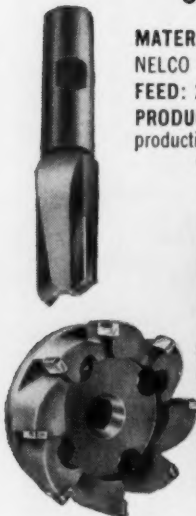
MAJOR AIRCRAFT MANUFACTURER MAKES...

Fully Automatic Savings with NELCO TOOLS on Tape Controlled Miller!

OPERATION #1 PROFILE MILLING AROUND WING SECTION

MATERIAL: Aluminum Alloy, Tough & Abrasive. **CUTTER USED:** 2" diameter, 2 flute NELCO Carbide Tipped End Mill. Negative Helix. **SPEED:** 3600 R.P.M., 1900 S.F.M. **FEED:** 20" per minute. **WIDTH OF CUT:** 1½". **DEPTH OF CUT:** ⅜ to ¾ inch. **PRODUCTION:** Nelco End Mill conformed to aircraft tolerances and to rugged automated production schedule.

There are 121 Nelco End Mills specially engineered to mill Aluminum.



Machine: Giddings & Lewis, 2 spindle vertical, 100 H.P. each spindle, tape controlled.

OPERATION #2 FACE MILLING WING SECTION

MATERIAL: Aluminum Alloy, Tough and Abrasive. **CUTTER USED:** Standard 6" diameter Nelco Face Mill modified with 30° chamfer. **SPEED:** 3600 R.P.M., 5400 S.F.M. **FEED:** 80" per minute. **WIDTH OF CUT:** 6" **DEPTH OF CUT:** ¼ to ⅜ inch. **PRODUCTION:** 2 cubic feet of metal removed in 20 minutes. 6 pieces per grind—12 cubic feet of metal removed per grind.



Again, NELCO Carbide Tipped Tools prove their economy and dependability. NELCO manufactures the most complete line of Carbide Cutting Tools engineered to mill ALUMINUM. They are available through your Local Distributor.

For that EXTRA Edge in Production!

Send for
the NELCO
Catalog
today!

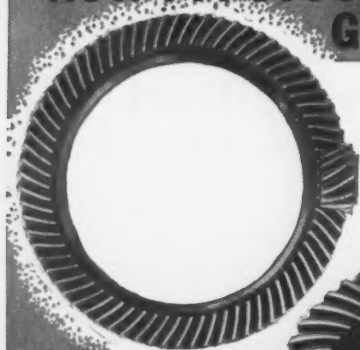
NELCO

NELCO TOOL CO., INC.
Subsidiary of: Cutting Tool Division
Brown & Sharpe Mfg., Co.
Providence 1, Rhode Island

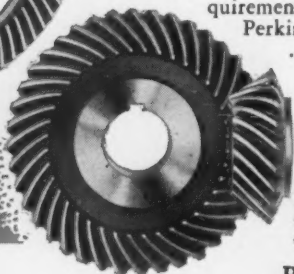


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NOW STOCK SPIRAL BEVEL GEARS TO CUT COSTS



Now for the first time Perkins offers a complete line of stock spiral bevel gears with precision quality to help you get maximum savings in tooling expense and gear cost. When you're planning for spiral bevel gears, design your requirements around this Perkins stock line . . . it can pay you well.



AVAILABLE ON REQUEST:

This new folder includes all standard specifications of Perkins complete line of stock spiral bevel gears. Write for folder No. D3.

Perkins stock spiral bevel gears have soft bores and may be reworked to a maximum diameter. The gears are matched in pairs and lapped together after hardening for smooth running. In many cases these gears are available in left and right hand drives.

This new line of stock gears includes the most commonly used ratios and sizes proportioned according to the Gleason Spiral Bevel Gear System.



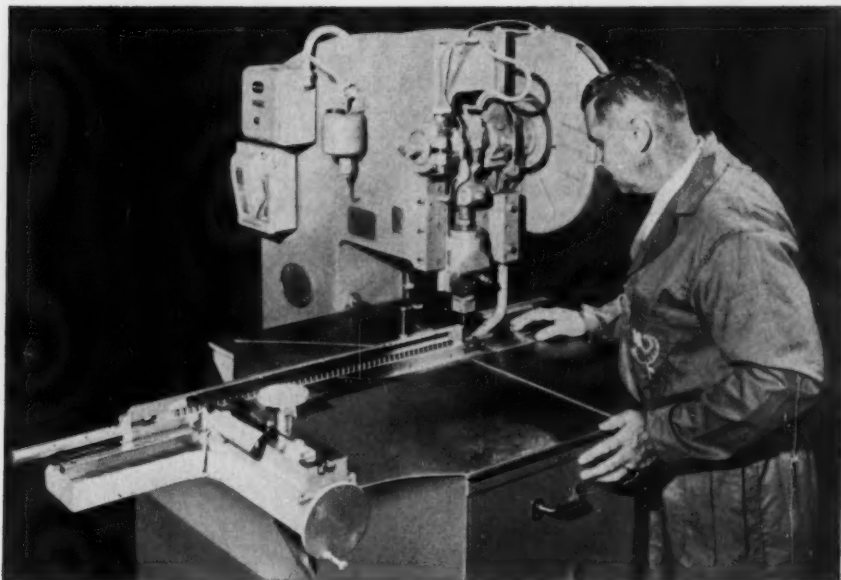
PERKINS

MACHINE AND GEAR CO.
WEST SPRINGFIELD, MASS., U.S.A.

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NEW PRECISION POSITIONING AND PIERCING MACHINE

Eliminates Expensive Tooling (Dies, Templates, Drill Jigs)



**Locates holes with .003 accuracy . . . sets up in 20-to-30 seconds . . .
speeds output of chassis for TV and other electronic components**

This brand new Bliss development has a deep throat press mounted on a specially-designed duo-dimensional gaging table. Its easy-to-set X-Y axis positioning bar can locate a hole in a few seconds within .003" of the specified position; settings are to .001". The Bliss precision positioning and piercing machine represents a new approach to quick change inexpensive tooling for all shapes and sizes of holes. It is the perfect tool for short-to-medium production on light metal electronic parts like TV and radio chassis, missile and aircraft components, punched fiber components, templates and printed circuits. Write us today for prices and detailed information.

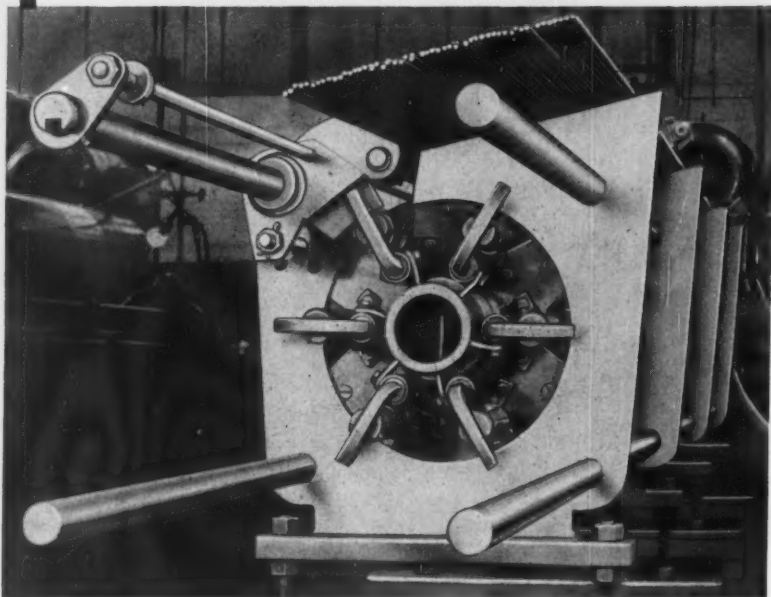


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E. W. BLISS COMPANY · Hastings, Mich.**

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AUTOMATIC LOADING

**FOR ALL POPULAR AUTOMATIC
MULTIPLE SPINDLE
SCREW MACHINES**



AUTOMATIC STOCK FEED

- ACRO-FEED automatically reloads in a continuous feeding cycle.
- ACRO-FEED feeds bar stock any length in one instantaneous feed out.
- ACRO-FEED side loading leaves more useable floor space.
- ACRO-FEED ups O.D. capacity by eliminating feed tube.
- ACRO-FEED assures minimum end waste and short pieces.
- ACRO-FEED feed rolls last 6 to 8 times as long as feed fingers.

Can be purchased from National Acme Co.

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ACRO-FEED INDUSTRIES, INC.

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NEW NOW ENGINEERED

ERICKSON
INSERTED BLADE

EQUALS DRILLING
ACTION OF TWIST DRILL

SPADE DRILLS

MORE RANGE AT MUCH LOWER COST THAN TWIST DRILLS

FULLY ENGINEERED BLADE GRIND...

Increased cross section at the cutting edge provides Greater Thermal Efficiency—Longer Tool Life than competitive blades.

FREER CUTTING ACTION

Exclusive Erickson method of grinding cutting angles gives Freer Cutting Action since end pressures are reduced.

"Heeling" eliminated.

EASY-TO-USE GRINDING FIXTURE...

Restores Original Factory Grind eliminating biggest obstacle to use of Spade Drills.

All cutting angles maintained during successive regrinds to original factory grind.

SPADE DRILL HOLDERS CORRECTLY ENGINEERED

"Funnel Effect" provided in flute design to speed chip escape.

Scientific distribution of coolant over whole cutting edge.

A-3321A

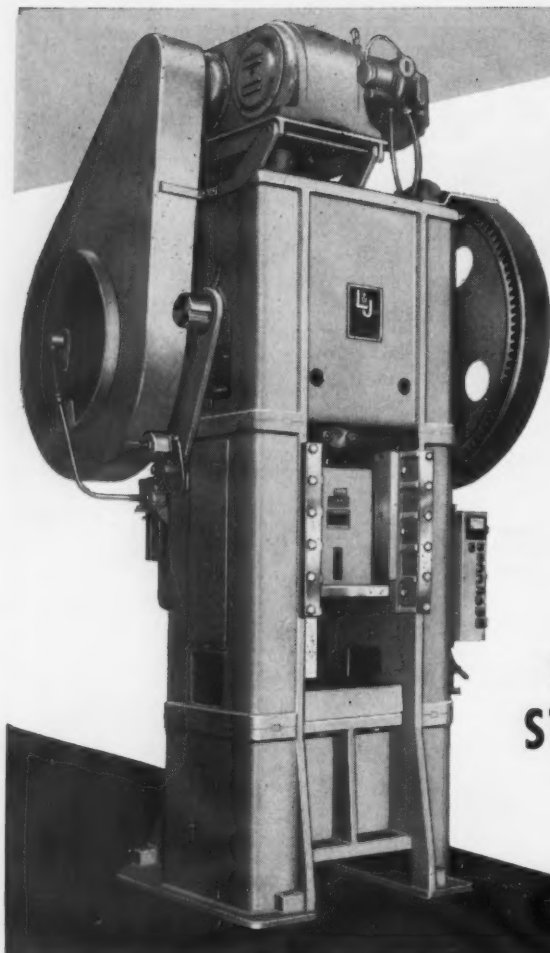
Send Your Drilling Problems to

ERICKSON TOOL COMPANY

34358 SOLON ROAD • SOLON, OHIO

- COLLET CHUCKS • EXPANDING MANDRELS • AIR-OPERATED CHUCKS • FLOATING HOLDERS • TAP CHUCKS
- AUTOMATIC INDEXING • MASTER SPACERS • DIAPHRAGM CHUCKS • PUSH-ON ARBORS • QUICK-CHANGE HOLDERS
- EXPANDING COLLETS • END-CLAMPING CHUCKS • AIR CYLINDERS (allowing stock to pass through)
- EXPANDING JAW MANDRELS • SPECIAL HOLDING FIXTURES (including gear-holding)
- BORING BARS • SPADE DRILLS • RECESSING TOOLS

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*Accurate
Efficient
Dependable*



**SINGLE CRANK
STRAIGHT SIDE
PRESS**

STANDARD EQUIPMENT

Air clutch and brake. Four square type gibs with bronze surfaced ways on ram. Hard bronze crankshaft bushings and ball seat. Ram counter-balances. Forced lubrication, J.I.C. controls, etc.

Write — Bulletin L-18 on 20 to 150 ton single and double crank straight side presses... also, 30 to 75 ton gap frame presses.

- 150 ton capacity adaptable to many jobs.
- Plain flywheel or back geared type.
- 6½" dia. main bearings, 9" dia. crank pin.
- Dimensions of bed and ram face, stroke length and shut height available as required.
- Extra heavy box type steel weldment tie rod construction.
- Rigid, accurate for precision and long die life.

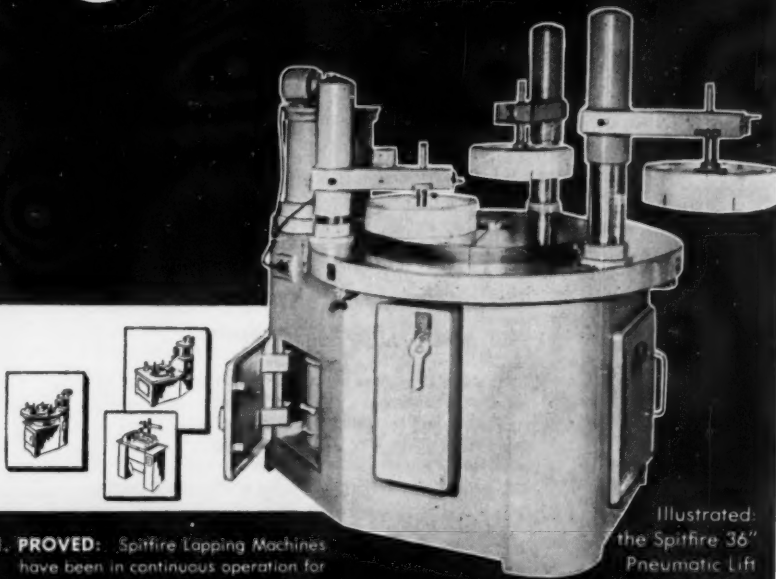
L & J PRESS CORPORATION, 1624 Sterling Ave., Elkhart, Ind.

For more data circle 387 on Postpaid Card

123

SPITFIRE

basic reasons Lapping is now a standard



Illustrated:
the Spitfire 36"
Pneumatic Lift
Flat Lapping
Machine

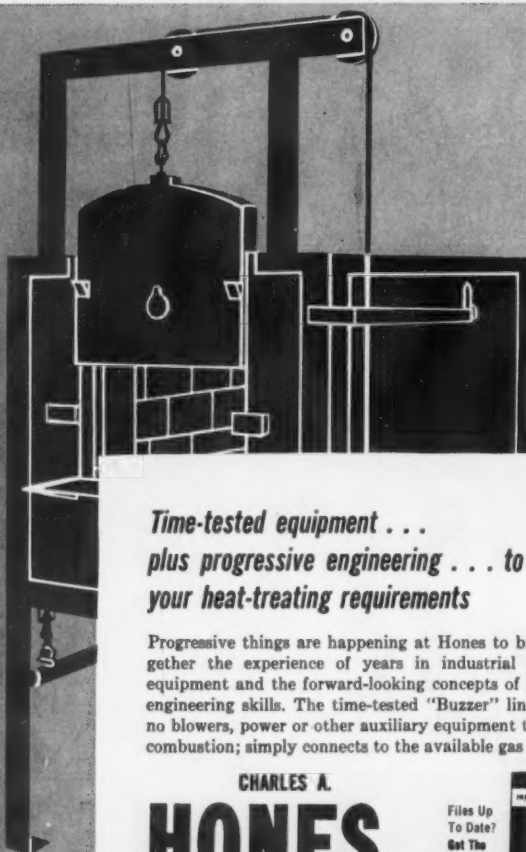
1. **PROVED:** Spitfire Lapping Machines have been in continuous operation for approximately two decades in almost every phase of industry... built-in quality and precision, experienced engineering assure demanded reliability.
2. **NEED:** Quality control requirements for lapping to thousandths of an inch precision has become increasingly necessary. Literally any piece part produced of any material is quickly, accurately, economically lapped and/or finished in small or high volume production with Spitfire machines.
3. **COMPLETE LINE:** from small bench type 6" roller lapping machines to 48" pneumatic flat lapping machines.

Write for free Spitfire Catalog.

SPITFIRE

TOOL & MACHINE CO.
2931 N. Pulaski Rd.
Chicago 41, Illinois
Phone: AVenue 6-1610

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*Time-tested equipment . . .
plus progressive engineering . . . to meet
your heat-treating requirements*

Progressive things are happening at Hones to bring together the experience of years in industrial heating equipment and the forward-looking concepts of modern engineering skills. The time-tested "Buzzer" line needs no blowers, power or other auxiliary equipment to effect combustion; simply connects to the available gas supply.

CHARLES A.
HONES INC.

141 S. Grand Ave., Baldwin, L.I., N.Y.

Files Up
To Date?
Get The
New Hones
Catalog



**MANUFACTURERS OF "BUZZER" EQUIPMENT FOR
HEAT TREATING • MELTING • SOLDERING... SINCE 1911**

For more data circle 389 on Postpaid Card

BEAT THE WATCH

with time-saving STRIPPIT hole punching units

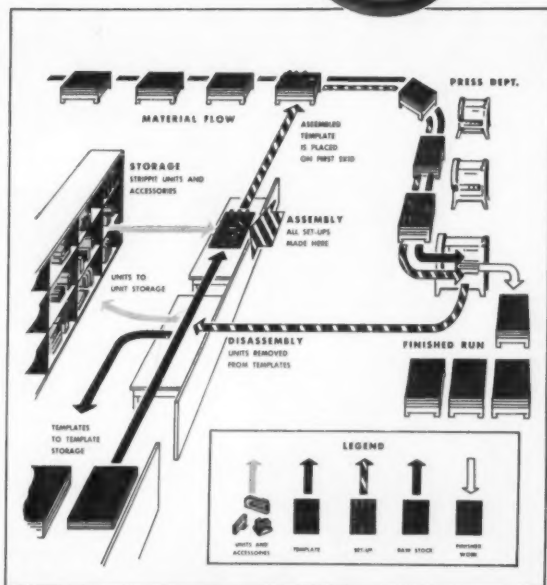


A stop-watch measures *dollars and cents* when it measures the time you spend setting up tooling. But the STRIPPIT System reduces hours to minutes and seconds... releases high bracket tool designers, die makers and die setters for work on more complicated dies involving forming, drawing and other operations.

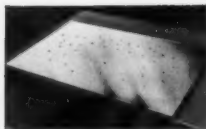
All it takes is a good mechanic to make STRIPPIT setups on bedrails, T-slotted plates or drilled templates. The latter are particularly valuable in saving press down time because the complete setup can be inserted as soon as the previous press run is finished.

STRIPPIT self-contained hole punching units come in a multitude of sizes and capacities to meet any pattern requirement. Newest of these are the "BN" and "CJ" series which can be used for punching round or shaped holes. Also available are notching units and units for punching angles and extrusions. Write now for the STRIPPIT General Catalog.

**See you at the
Tool Show... booth 1305**



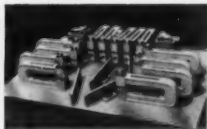
Typical STRIPPIT setup takes only 25.33 minutes from work order to finished piece



The STRIPPIT System begins with examining the blueprint, selecting the pre-drilled template and placing on setup table.



Feed rails and work stops are mounted securely to the template according to the size and the shape of the blank.



Notching units and hole punching units are mounted. Pilot pins concentric with punch assure precise positioning.



Complete setup is inserted in press and bolted down, shut height is adjusted and first piece punched and checked.

WALES STRIPPIT INC.

207 Buell Road • Akron, New York

In Canada: Strippit Tool & Machine Company, Brampton, Ontario

In Continental Europe: Raskin, S.A., Lausanne, Switzerland

In the British Isles: E. H. Jones (Machine Tools) Ltd., Hove, Sussex, England

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May, 1961

MODERN MACHINE SHOP

84a





FOR TURNING

how to



In a plant where Wesson job-analysis cut tool costs over \$200,000 in 18 months, on-end type tool (MX8-T5 holder and Wessonmetal WH insert) proved superior on this job to throw-aways and brazed tools.



BORING

A Wesson man pre-engineering the tooling for boring track-links of 325 Brinell. Result: over 200 pcs. per grind from the start. Wessonmetal solid WH inserted blades used.



MILLING

Safety at almost 1 1/2 miles a minute is job-engineered into this Wesson T-72 Rigidcut with Wessonmetal GI blades. The faster it cuts, the tighter the blades seat. Lubrication is centrifugal to each blade through holes in the body . . . and you don't have to reset blades every time you grind.



...THROW-AWAYS, ON-END TYPE, or BRAZED?

*make it easier
to decide...*

With the new Wesson T-A holder, old troubles with throw-away holders for turning have disappeared like magic. Easily indexable in any position, with only two major units, fully adjustable, the new Wesson T-A is the result of 3 years of research and 25 prototypes.

New developments like this make it important to take another look at your own tooling. Where will it fit in best? Where will Wesson band-type or brazed type tools do better? Here the Wesson man in your area can be of real help to you:

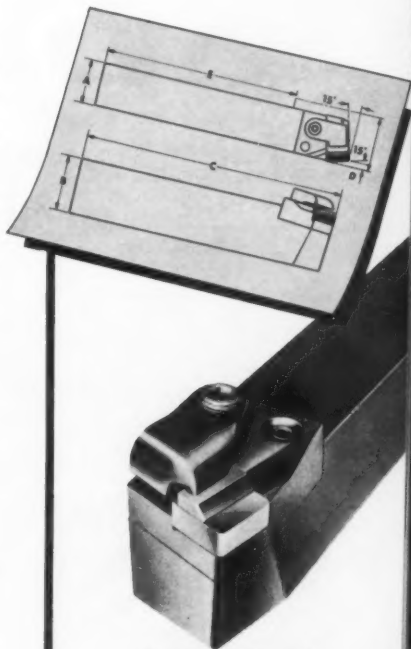
1. His recommendations will be unbiased, since Wesson makes **ALL THREE** types
2. He has a thorough knowledge of which works best under different conditions
3. He was picked for his turning, boring and milling know-how
4. He will job-engineer your applications in your plant
5. He will see to it that the tools you buy will give you best possible performance

Let him work for results in your plant like those shown at the left. He costs you nothing. He is as near as your telephone.

He is backed by the combined experience of the entire group of Wesson's 4 specialized tool plants, plus Wesson's basic research and tool engineering groups, plus Wesson's own carbide metals plant.

Ask him for a copy of "HOW TO TURN WITH THROW-AWAYS, BAND TYPE OR BRAZED TOOLS". Or, if you prefer, ask us for a copy right now. It helps you make it easier to decide which type of tool to use.

Wesson Company, 1220 Woodward Heights Blvd., Ferndale 20, Michigan. In Canada: Wesson Cutting Tools Ltd., 93 Judge Road, Toronto 18, Ontario.



New and Now In Mass Production

The Wesson T-A (throw-away) holder is simplicity itself . . . to use, to index, to stock. It has only two units . . . the shank with its 2 in 1 flat-seat anvil-locator and the clamp unit with wide range adjustment and adjustable solid carbide chip-breaker. Ask for Bulletin T-160.

WESSON

• ARCHER & SMITH • WESSON MULTICUT CO. • WESSON METAL CORP. •

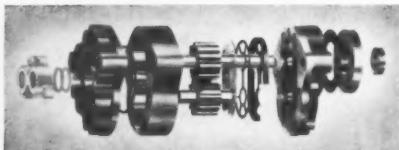
• WESSON CUTTING TOOLS LTD. •

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Precisionaire gages qualify parts and tolerances to tenths on as many as ten simultaneous dimension readings.

This fleet of PRECISIONAIRE® gages... controls Cessna quality at the machines



Six models of this Cessna hydraulic pump, used on farm and construction equipment, are gaged during production.



Honing machine operator checks valve body bore at 9 points at once, determines .0001" classifications.

"Without the proper type and quantity of gaging equipment, we never would have been able to produce such high quality hydraulic pumps, valves, and cylinders at such low relative costs," reports the Industrial Products Division of Cessna Aircraft Company.

Knowing that bad pumps correlate with lack of gaging equipment, Cessna has a complete set of gages for each model pump, ready to roll to the machines for quick setup and start of production. Thirty-five rolling gage cabinets, carrying more than 400 Precisionaire columns, are used in the production of these pumps.

All pump parts are produced to be completely interchangeable—there is no classifying or selective fitting. This results in minimum investment in parts inventory, a very rapid rate of assembly, and practically no reworks.

Interchangeable parts greatly simplify replacement problems. Inventory is at an irreducible minimum, service problems are negligible, and users are happy with the minimum maintenance and maximum performance of the pumps.

Write for The Cessna Story and Precisionaire Catalog SPG-160. The Sheffield Corporation, Dayton 1, Ohio.

The
SHEFFIELD
Corporation  Dayton 1, Ohio

A subsidiary of The Bendix Corporation

Inspection Gages, Dimensional Control Instruments, Machine Controls, Automatic Gaging & Assembly Systems, Measuray® X-Ray Thickness Measuring, Crushtree® & Multiform® Grinders, Cavitron® Ultrasonic Machine Tools, Press-Pacer® Transfer Units, Large Dies, Tooling, Contract Manufacturing.

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REDUCE MANUAL HANDLING OF PARTS TO A MINIMUM

SYNTRON

Transfer & Storage

PARTS FEEDERS

**Relieve production lag between
primary and secondary operations**

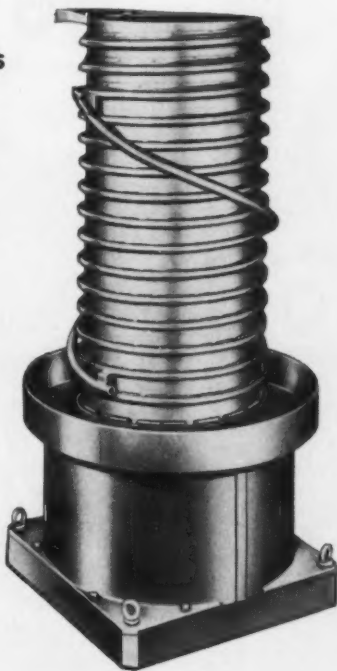
Syntron Transfer & Storage Parts Feeders are designed to receive parts at one level, store prior to usage and discharge in an oriented position at another level. They provide an automatic, instantly adjustable method of distributing parts from one process operation to another; eliminating slow, manual parts handling.

The powerful electromagnetic drive unit produces 3600 instantly controllable vibrations per minute. Simplicity of design means dependability of operation, longer service life, and lower maintenance.

If you have an operation to operation parts handling problem, Syntron Transfer & Storage Parts Feeders will help reduce costs and speed production.



Call your Syntron Representative
or write for a Syntron Parts
Feeder Catalog Section.



61PF4

SYNTRON

SYNTRON COMPANY

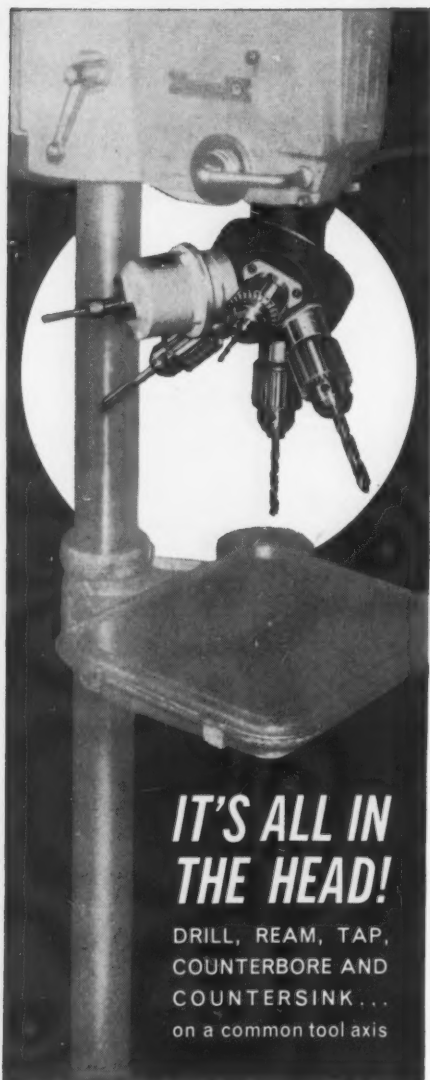
309 LEXINGTON AVE., HOMER CITY, PA.

For more data circle 393 on Postpaid Card

May, 1961

MODERN MACHINE SHOP

85



**IT'S ALL IN
THE HEAD!**

DRILL, REAM, TAP,
COUNTERBORE AND
COUNTERSINK...
on a common tool axis

5 Spindle Model Shown

**... CONVERT YOUR DRILL
PRESSES INTO PRECISION
TURRET DRILLING
MACHINES WITH ...**

QUADRILL 4 & 5 SPINDLE **TURRET DRILLING HEADS**

- Save up to 70% in direct labor costs!
- Fast manual indexing
- Quadrill Turret Heads make it possible for **one** drill press to do the work of 4 or 5 single spindle drills, with a corresponding saving in floor space . . . save up to 350% in capital equipment costs!
- Ideal for both long and short runs . . . fast setups . . . simple tooling. On long runs, savings in direct labor quickly returns cost of turret head.
- Models available for all standard drill presses.

Quadrill Turret Drilling Heads are proven in industry throughout the world for over 15 years . . . in companies such as Westinghouse, Chrysler, Bendix, General Electric, Douglas Aviation, Boeing and many others.

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BROCHURE**

CHICAGO QUADRILL
Company

1854 BUSSE HIGHWAY, DES PLAINES, ILL.

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"SUB-ZEROING"

**assures maximum accuracy of
BEARING RACEWAYS**

**LEADING
MANUFACTURERS**

This chamber provides even temperature with quick pulldown, and is suitable for stabilization, as well as production line assembly.

**Expansion fit assembly,
through use of low temperatures, guarantees
tight fit, perfect alignment.**

MODEL
R - 70 - 10



choose
**CINCINNATI
SUB-ZERO
CHAMBERS**

To assure maximum accuracy for every turning operation, The R. K. LeBlond Machine Tool Company, internationally known lathe manufacturer, utilizes this Cincinnati Sub-Zero Products chilling machine in expansion fit assembly of bearing raceways.

Heavy duty lathe spindles are mounted in precision tapered roller bearings which run in close tolerance steel raceways. Expansion fit assembly guarantees that raceways will fit tightly in head stock, perfectly aligned for true operation. Parts are assembled with ease, and production time is decreased.

*Our engineering department is as close as your phone.
What are your problems? We will be glad to help you
with them.*



CINCINNATI SUB-ZERO PRODUCTS

General Office & Plant

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See us at Booth 2002, ASTME Show, New York Coliseum, May 21-26
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IT'S A FACT

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DAY-AFTER-DAY, YEAR-AFTER-YEAR

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TOGGLE CLAMPS



Steel sections of heavy tractor frame
are located and held securely for
welding assembly operation.

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TOGGLE CLAMPS

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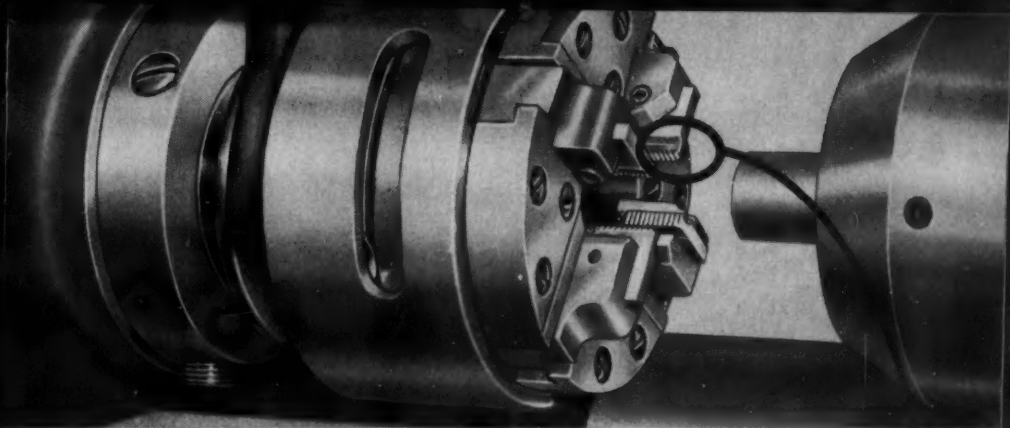
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H&G Style MM Die Head on a Multiple Spindle Automatic

How to Save Thousands Annually on Your Threading Operations!

Why pay for a carrier every time you buy a chaser?

A set of H&G Throw-away Insert Chasers is rigidly held in separate carriers, which you buy only once! With ordinary chasers, you pay for the built-in carrier in every set. H&G Insert Chasers save you dollars by eliminating all this unnecessary material and costly labor.

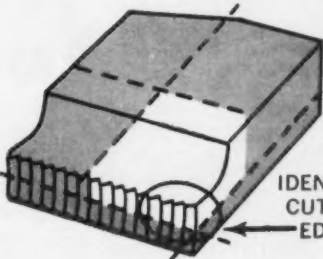
You get 3 to 5 sets of H&G Insert Chasers for the price of 1 set of ordinary chasers.

Multiply your annual chaser consumption by \$8 to \$26 per set and see how you, too, can save thousands! And, since H&G Insert Chasers can be used in as many as 22 different H&G Die Heads—you save even more.

H&G INSERT CHASER



ORDINARY CHASER



IDENTICAL CUTTING EDGES

Write today for NEW Bulletin No. 11D on H&G Rotating Spindle Insert Chaser DIE HEADS.



THE EASTERN MACHINE SCREW CORPORATION

65 Barclay Street • New Haven 6, Connecticut • STate 7-5724

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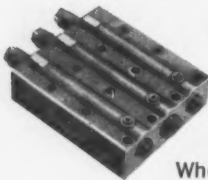
POSITIVE AUTOMATIC PRESSURE CONTROL?

CHECK YOUR REQUIREMENTS
AGAINST FULFLO SPECIFICATIONS

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- ✓ Pipe sizes to 3"
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- ✓ All-steel for extra safety



FULFLO gives you what you want in safe, trouble-free and quiet operation for any hydraulic system. Shear-closing action eliminates chattering; sliding piston gives full flow opening; distinctive construction allows easy adjustment within the valve's pressure range or change of the pressure range. Whatever your requirement . . . for O.E.M. use or replacement service . . . there's a FULFLO Oil By-Pass Relief Valve designed just right, built right and priced right, too!



NEED A "Special"?

FULFLO can engineer a special valve to your most exacting requirements. Examples of "specials" are shown in Data Book.

FOR EXTRA CONVENIENCE

Where frequent pressure setting adjustment is needed, install a FULFLO Hand Wheel Valve. Made in a variety of styles.



FOR COMPLETE INFORMATION, request a copy of the FULFLO Valves Mechanical Data Book with complete specifications and engineering data.

THE FULFLO SPECIALTIES CO.
INCORPORATED

416 Fancy Ave.

Blanchester, Ohio

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THOMSON INTERCHANGEABLE die-set BALL BUSHINGS®

NEW!

GO ANTI-FRICTION

with a simple bushing replacement

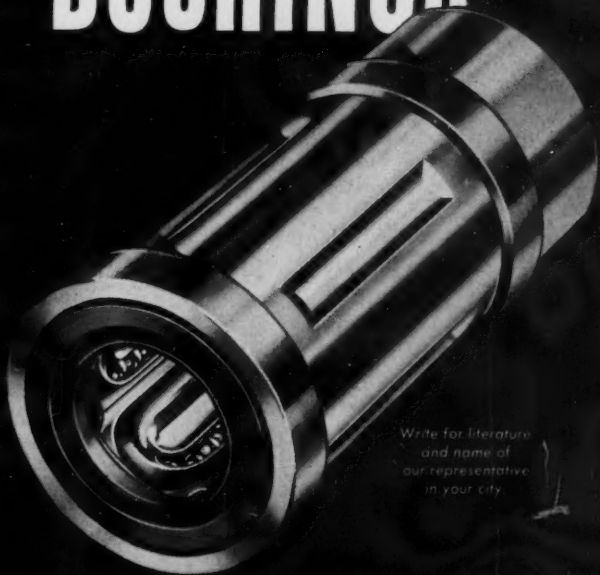
- and ① Improve performance
of your present dies
- and ② Reduce tool room costs

In the PRESS ROOM

Ball Bushings allow closer fits and maintain alignment which increases die life and permits longer uninterrupted runs. Fewer sharpenings and sustained parts accuracy also result. Periodic lubrication is eliminated and higher speeds are possible. Unlimited travel permits die to be used in any press regardless of stroke. Costly smash-ups due to seizure are eliminated.

In the TOOL ROOM

No cocking and binding... hence the punch holder floats off and on! No time consuming die jacking! Free-rolling ball bearings enable the toolmaker to actually feel in the fit of mating parts. This saves more time and makes better dies.



Write for literature
and name of
our representative
in your city

THOMSON INDUSTRIES, Inc.

Dept. D4, MANHASSET, NEW YORK

Makers of 60 Case hardened & ground shafting and
NYLINED Bearings... Sleeve Bearings of DuPont NYLON
For more data circle 399 on Postpaid Card

See Your **COST DIFFERENCE** with this **DIFFERENT FINISHING MEDIUM**



**START
GREATER
SAVINGS
& PROFITS
NOW!**

**WRITE
FOR
BRIGHTBOY'S
CATALOG-MANUAL
covering:**

- Methods & Applications
- Machine Speeds
- Job-Matched Wheels, Sticks, Rods, Blocks & Points
- Wheel Sizes — Complete Range

Replace Older, Costlier Methods!

Brightboy's exceptional rubber-and-abrasive working action is breaking cost barriers NOW for countless users:

**BURRING • CLEANING
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in one, simultaneous operation
TIME SAVINGS UP TO 50%

Brightboy's bigger savings bring bigger profits! **JOB-MATCHED**, quickly available Brightboy items are **STOCK**, for immediate use, without time-taking dressing or preparation. For machine, automation and manual operations.

This only complete line of soft rubber bonded abrasives possess almost unbelievable versatility for working:

**ALL METALS • WOOD • GLASS • FIBERGLASS
LAMINATED MATERIALS • SOME PLASTICS**

WIDE RANGE of Silicon Carbide and Aluminum Oxide **STOCK TEXTURES**—extra fine to extra coarse—in soft, semi-firm, firm and tough rubber binders.

**BRIGHTBOY INDUSTRIAL DIVISION
WELDON ROBERTS RUBBER CO.**

95 North 13th Street • Newark 7, N. J.
America's Pioneer Manufacturer of Rubber-Bonded Abrasives



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BORING CRITERION

Criterion makes 26 different models with a boring range of $\frac{1}{8}$ " to 20".

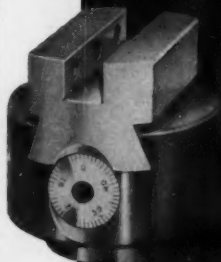
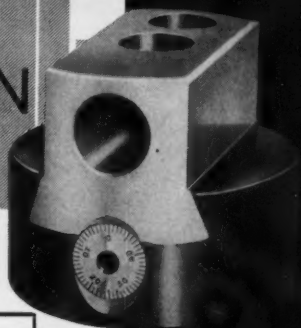
Among those available, you may select tenth-setting heads for extremely close work, square and slotted bar holder heads for special application, and a variety of hole sizes from $\frac{3}{8}$ " to $1\frac{1}{2}$ ".

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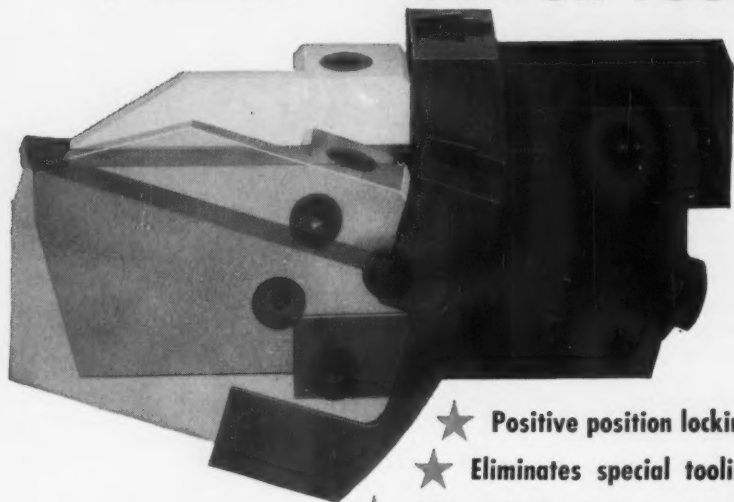
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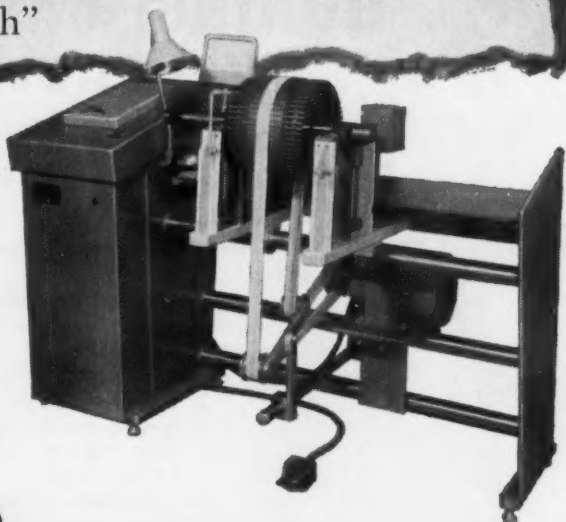
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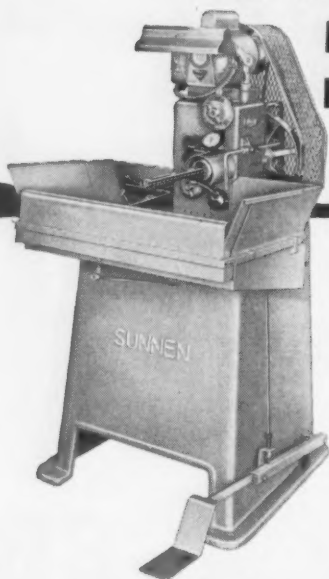
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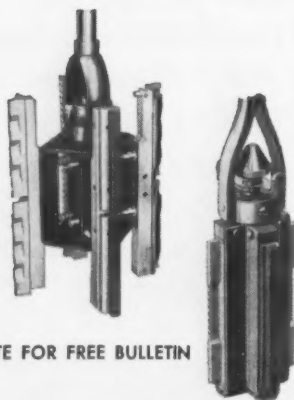
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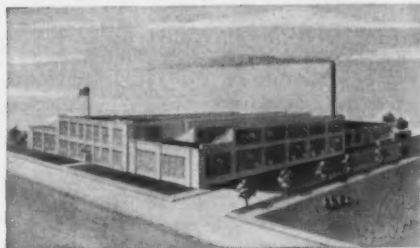
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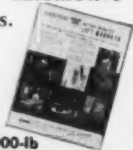
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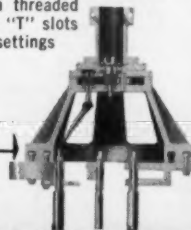
Universal joints are of an advanced structural design which feature: low deflection rate; superior fatigue resistance; greater overload capacity and longer life. Joints have a snap-on feature and can be slipped off the spindle without use of tools.



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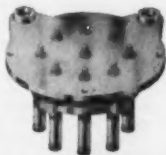
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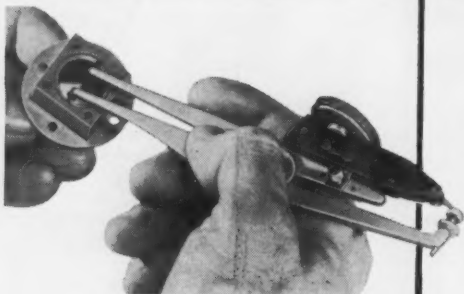
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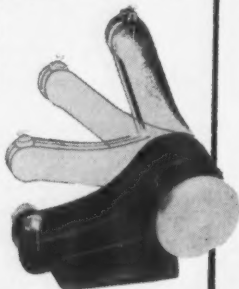


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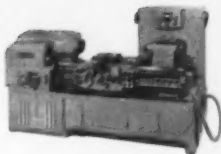
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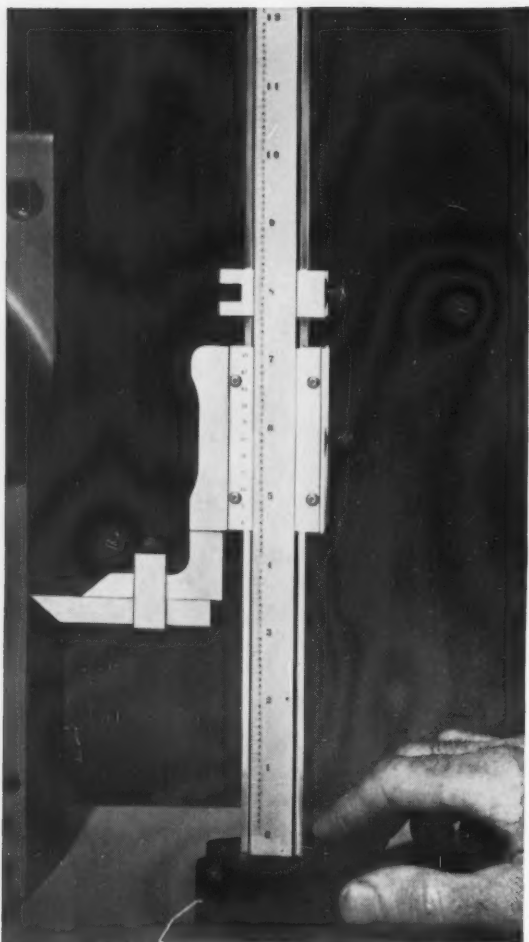


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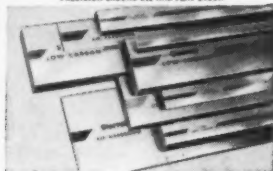
In the new, popular priced, No. 255 Series Flush-Reading Master Vernier Height Gage, Starrett presents a lighter weight companion to the No. 254 heavy duty Master Vernier Height Gage.

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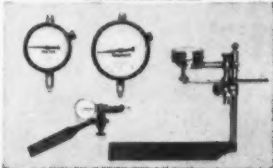
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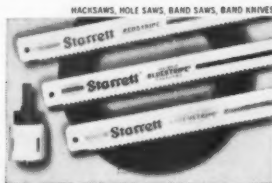
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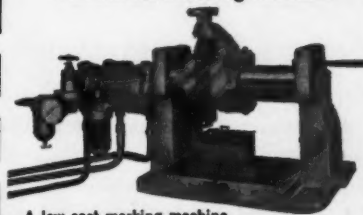
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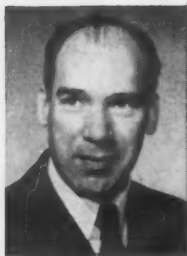
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MODERN MACHINE SHOP 101



Fred W. Vogel

Over the Editor's Desk

CONFERENCE AND EXHIBITION

The importance of keeping abreast of new developments in the metalworking field via the conference and exposition route cannot be overemphasized and when an opportunity presents itself in a form such as this month's ASTME Engineering Conference and Exhibition in New York, every effort should be made to attend.

As explained in this issue beginning on Page 184 fifty papers ranging from welding, forging and cutting metals with explosives to new techniques in grinding will be presented during the Conference. Subjects include surface metrology seminar, material removal symposium, manufacturing with numerical control systems, use of computers in manufacturing operations management, application of explosives in metal forming, workholding developments, numerically controlled machining operations, operations research—process planning, machining malleable iron and cast iron, press tooling and die design, heat treating instruments, metal cutting carbides, work simplification, precision grinding, and so on.

Concurrent with the Conference will be the Exhibition at the New York Coliseum where more than six thousand production equipment items will be displayed.

A rewarding experience may be yours May 22 through 26 . . . in New York.

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A CHALLENGING PROGRAM

Dr. George S. Benson, President, National Education Program recently sent us the following message on productivity. Because productivity has become such an important issue everywhere throughout our economy, we feel that those engaged in metalworking activities will particularly profit from reading this message.

America has the finest skilled labor to be found anywhere in the world. Despite the wasteful and crippling strikes that slow up one major industry or another almost every year, I am convinced that most of this nation's wage earners are sincerely desirous of achieving continued high levels of production. I believe that most members of unions desire to maintain peace and harmony between management and labor.

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There are many layouts and setups that require calculation . . . your engineering cannot furnish all of them . . . if your workmen are using TRIG-EASY METHODS of calculating then you are "saving time and material" and avoiding trial and error methods. This is money in your pocket!

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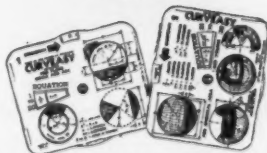


Thousands of these charts used by draftsmen, tool, die and jig makers, machinists, students, inspectors, template makers and designers. EACH CHART HAS INSTRUCTIONS TO SHOW YOU HOW TO DO IT.

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Over the Editor's Desk . . .

Our workmen are great producers. They use the finest collection of tools to be found anywhere, supplied for their use under our free system by investors in enterprise. Our workers produce as free men, and they want to keep on producing for markets both foreign and domestic. It is true that people in some foreign lands do not yet have enough buying power to purchase consumer goods from us in vast quantities. It is also true that world markets are fiercely competitive, partly because goods made in some countries have the price advantage of cheaper labor costs.

Nevertheless, it seems possible that we can sell more abroad than we have been selling, if we plan to do it. Perhaps we are not producing the right products. Much imagination is required in finding the products and the markets. But perhaps what we most need today is more efficient production. Foreign steel can be bought in America for \$40 per ton cheaper than our own steel. Barbed wire can be bought in your local hardware store \$2 a spool cheaper than American wire. Many foreign-made products are underselling us. I am convinced, however, that with our investment of \$20,000 per worker for the finest tools available, we should easily produce more for less cost and still earn far more than foreign workers earn.

If employees across the land could work wholeheartedly toward increasing productivity, devoting themselves to boosting their own efficiency and readily accepting the guidance and recommendations of management, we would be able to increase productivity by 20 percent. There seems to be room for this increase. The late Dr. Sumner Slichter, the notable Harvard economist, reported before his death in 1959 that wages in the preceding decade had climbed twice as fast as productivity.

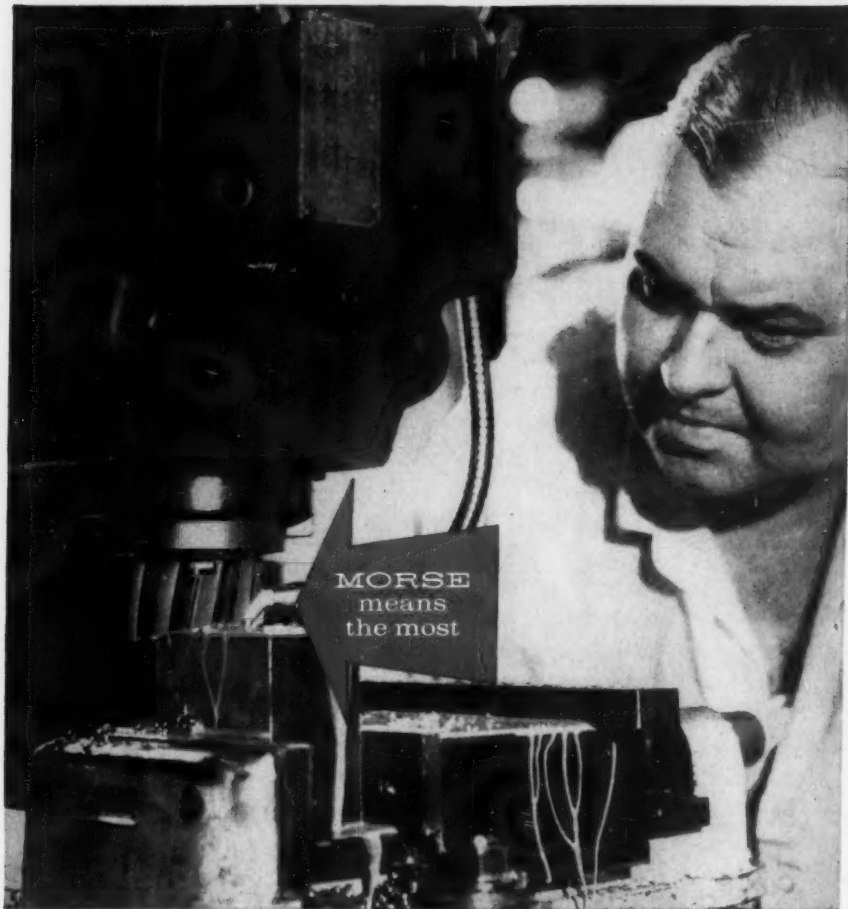
To some extent we are in serious trouble simply for this reason: Wages have risen faster than production. Union leadership always has been eager to boost wages, but this leadership has not been equally concerned about productivity. Better understanding between labor and management is a most urgent need. With cooperation on both sides, we can increase our activity in world markets, expand our foreign trade and help increase our balance in world commerce enough to slow the outflow of our gold. This can be done, if we all work together, without reducing wages and without injuring the nation's economy. It would cut down unemployment, increase national income, protect jobs, and be to the advantage of everybody.

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KARL A. NEISE

The metalworking industry has lost a friend in the passing recently of Mr. Karl A. Neise, President, Karl A. Neise, Incorporated. Mr. Neise was 63 years old and an interested, active member of many business and technical organizations. He had founded his own business over two decades ago and built it up to its present stature and reputation.

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May, 1961

MODERN MACHINE SHOP 105



Report from Washington

on Events Which May Affect You and Your Job

• **SURPLUS GOVERNMENT MACHINE TOOLS MAY BE SENT ABROAD** as part of the foreign aid program. The U.S. owns about 300,000 pieces of metalworking equipment, some of it old or obsolete. Industry people are cooperating with officials to determine the nature of the items in surplus and the potential demand for them among the underdeveloped nations. Details of the terms of the program are still to be worked out.

• **THE BUSINESS RECOVERY MAY BE A LOT BRISKER** than you have been led to believe. Some leading economists in government and industry think they detect signs of a powerful economic expansion—a much sharper upswing than generally projected. These men are still in the minority. But, because of their prestige and influence, their views are worth considering in planning. The prevailing view of the business outlook sees an increase of, say, 3% or 4% in total output of goods and services by the end of this year. By contrast, the more optimistic size-up projects a gain of up to 7%—something more akin to the explosive upturn of 1958—during the last business cycle.

• **YOU CAN MAKE A FAIRLY STRONG CASE FOR A BRISK UPTURN.** For one thing, the budget deficits for this and the coming year may well exceed the President's estimates; this could generate jobs and add to consumer incomes. For another thing, prospects for autos and appliances seem to be improving. The optimists also cite the record of past cycles to prove that recessions usually are followed by quite sharp bouncebacks—not slow, gradual climbs. The optimists put a lot of emphasis on a psychological factor—the stock market. They see it as a key force for expansion. The averages may be going up for technical reasons—the shift from bonds by pension trusts, insurance companies, etc. But it does induce consumers and businessmen to raise spending.

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Report from Washington . . .

- **KENNEDY'S ADVISERS ARE STILL DISTURBED** about the trend—even though business will probably end 1961 with tidy gains. Even if the recovery turns out to be brisk, the stepped-up activity will barely be sufficient to absorb the 1-million-plus new workers to be entering the labor force during 1961. In other words, we'll end '61 with unemployment almost as high as it is now. Unemployment is now critical. And officials fear it may get worse unless the economy grows faster. These days, rising productivity can account for the growth we're getting, while very few of the 1 million-plus new workers entering the labor force each year are hired. Economists of the New Frontier feel it will take heavy federal action to get things moving.

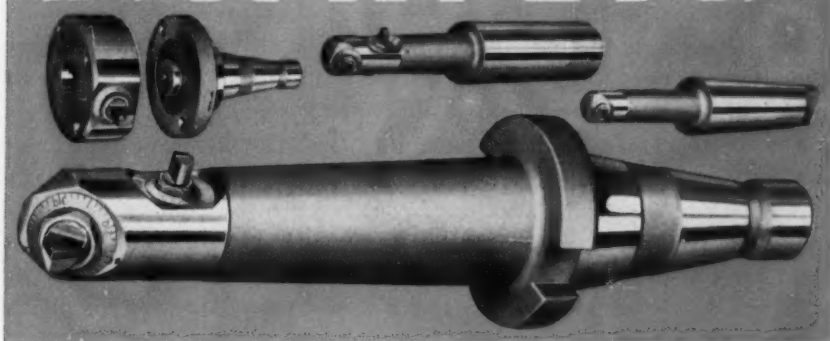
- **THE KENNEDY ADMINISTRATION DOES PLAN ON MORE SPENDING . . .** in 1962. By that time, officials hope, the political climate will be more favorable. Specifically, they are hoping that Congress will be much more amenable to the President's leadership. Or at least the opposition will be diminished. Kennedy's team is counting on two factors to budge Congress: The President's popularity—Polls show that it's very high. Lawmakers hesitate to oppose a President with broad support. Congressmen's own mail—Legislators say that it is now much heavier than normal—and that a preponderance seems to favor the programs that the Kennedy Administration has proposed. In 1962, Kennedy people figure, the tide will be with them. There won't be much that's new in next year's program, say officials. But the scale of the 1962 programs will be bigger and much more ambitious . . . designed to achieve growth goals.

- **DON'T EXPECT INTEREST RATES TO DECLINE FURTHER** in the period ahead, despite the government's steady drive to bring them down as a business spur. The fact that business has begun to head up foreshadows an increased demand for money . . . to carry inventories, finance consumer buying, and for mortgages. And the Treasury will be borrowing all along to pay for the coming deficits. Investment bankers report increasing interest on the part of corporations in floating bond issues to raise funds to meet anticipated needs. Municipalities are already borrowing at a heavy rate. So businessmen are advised not to wait too long before arranging financing. The best time to borrow is now.

- **DEMANDS FOR GREATER PROTECTION AGAINST IMPORTS** are flooding in upon Congress these days. Legislators report that this seems

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MODERN MACHINE SHOP 109


Report from Washington . . .

to be one of the hottest issues with the public—union people as well as businessmen. The complaints come from all segments of industry . . . textiles, machinery, and a wide range of consumer items. Some steps to meet this demand may be taken. The Kennedy Administration, like its predecessor, is wedded to a policy of increasingly free trade. Recent actions—on textiles, for example—re-emphasize this. What's more, U.S. negotiators are preparing to grant new tariff cuts during this year's conference at Geneva. The negotiators already have the powers they need under legislation passed last year. There won't be any opportunity to force increases in duties. This doesn't mean that there *won't* be any relief for hard-hit industries. Representation to Congress and the White House, plus threats of boycotts of foreign goods, will bring action to forestall damage to trade relations with friendly nations. The relief, though, will probably take the form of new quotas voluntarily imposed by other countries to limit shipments.

- THE GOLD CRISIS MAY NOT BE COMPLETELY OVER YET, say monetary experts. President Kennedy's actions, plus cooperation from countries of West Europe, have bolstered confidence in the dollar and stopped the dangerous outflow. But the threat of a resumption of trouble still persists, below the surface. It could flare up again if budget deficits rekindle inflation later in 1961. Rising prices, it is feared, could make American goods less competitive in world markets and, thus, worsen our balance of payments. This, in turn, could feed on itself—damage confidence once again and start gold fleeing to "safer" parts of the world. The chances of avoiding new monetary trouble are seen as little more than, say, three or four to one.

- NIXON'S POLITICAL STRATEGY FOR 1964 does *not* call for running for governor of California next year. Republican political strategists know that he can have the nomination if he wants it; his following is large. But Nixon would be taking a big risk, running against popular Pat Brown. If Nixon lost next year, his chances for 1964 would be hurt. So he's expected to play it safe—unless Rockefeller's star begins rising so fast that a vote-getting show is necessary.

- BARRY GOLDWATER MUST ALSO BE RATED A CONTENDER for the nomination in 1964, despite denials that he's running. The Senator from Arizona is being given a big build-up by conservative supporters. He will be written up in national magazines. Several books on the man and his philosophy are in preparation.



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MODERN MACHINE SHOP 111



As I See Your Supervisory Problems

By ALFRED M. COOPER

Consulting Editor, Modern Machine Shop
and author of "How to Supervise People"

Every supervisor and executive should make an effort to distinguish between *change* and *progress* as these terms are applied to personnel problems, and do this with reasonable speed and effectiveness. Any action he takes in such instances must, of course, depend upon the degree of authority he possesses and, of course, he must take into consideration the attitude of his subordinates in the matter.

As one minor instance, many head men question the value of the coffee-break as an aid to increased output, yet this routine has become so well established that the executive who disapproved of it would be placed in almost as difficult position as the British boss who attempted to abolish 4'oclock tea.

Changes in production routine may readily be evaluated in terms of production costs, and continued or abolished on this basis with little loss of time and little or no effect on employee morale.

In the case of changes in procedures directly affecting employee morale, however, it is far more difficult to determine whether these are worthwhile, and may be classified definitely as *progress*. As a rule the sponsors of such changes within a plant are emphatic in labeling these as steps toward Utopia. At the same time, since all of us dislike being considered stick-in-the-muds we will not offer serious objections to any change, figuring that if it does not represent progress it will soon fall of its own weight.

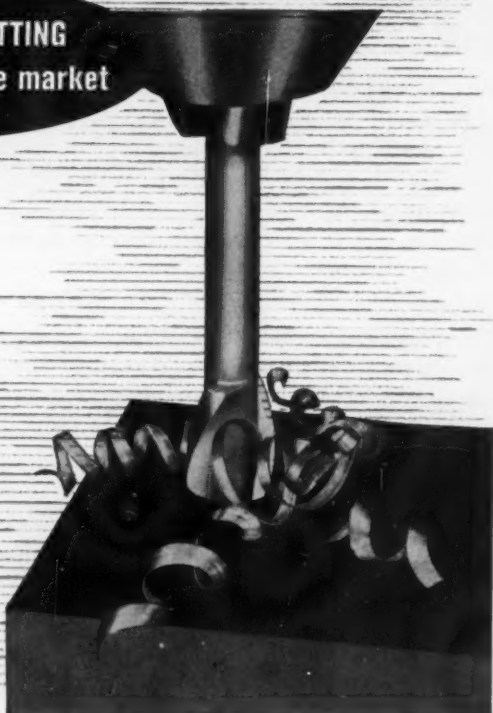
Any group of executives or supervisors with upwards of 30 years of experience can, in a conference, enumerate at least 30 vital changes in employee procedure they have seen come and go. Each of these at one time was labeled revolutionary and epoch-making. Of some we now look back-

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May, 1961

MODERN MACHINE SHOP

113

Supervisory Problems . . .

ward and are amazed that they ever became standard routines, even for as long as a week.

Yet it is difficult to apply the yardstick of longevity in determining the worth of any such change. Even though it definitely reduces employee output at a time when every argument favors better worker performance, such a change may hang on for years. If this was a change in production methods its fallacy would become apparent in a matter of days and would then be scrapped.

But today, and indeed during the past 30 years, no head man has cared to be considered as standing in the way of progress, and of course any *change*, however ridiculous, may look like *progress* even over a period of years. Yet with foreign competition becoming each year more and more of a factor in our ability to maintain not only our high living standards, but our place as a nation that leads the world industrially, we cannot afford to accept any old change as progress.

In instances it may prove fortunate that most individuals, even the workers, have an ingrown opposition to change. This may not be altogether admirable, but it helps to keep us from going hog wild. This is particularly true when the pressure for change is being exerted from abroad, and such changes simply do not fit into the American way of doing things.

I suppose the most commonly recognized change in our industry is change of rates of pay—nowadays always scaled upward. But a study recently made, while proving that all American workers covered in the survey are receiving higher wages than in 1958, also proves that there are in existence some surprising inequalities in effect within different industries in terms of the purchasing power of today's dollar.

Thus, we find that federal employees, telephone workers, utility employees, school teachers, retail-trade employees, and railroad employees are now actually better-paid than in 1958. Farm laborers are exactly holding their own. Workers in nondurable goods now receive in wages but 99.2 percent of their 1958 purchasing power, while retired federal employees, workers in durable goods, farm operators, auto workers, steel workers, and soft-coal miners are worse off, in that order.

Here we have a single instance of change that actually represented progress (at least financially) for about half of the workers listed in the above classification and retrogression for the others. This appears to be about par for any vital change in conditions affecting the employee.

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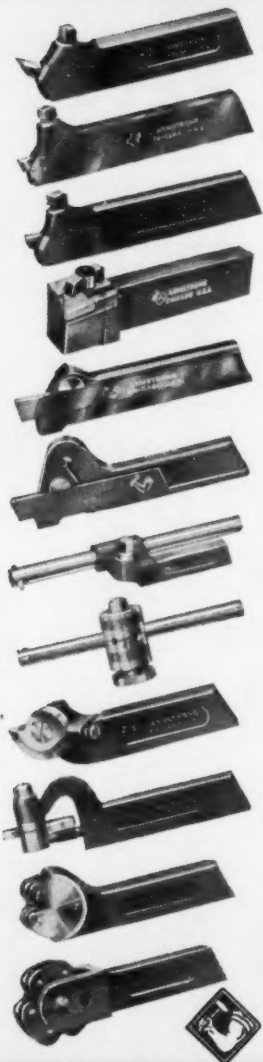
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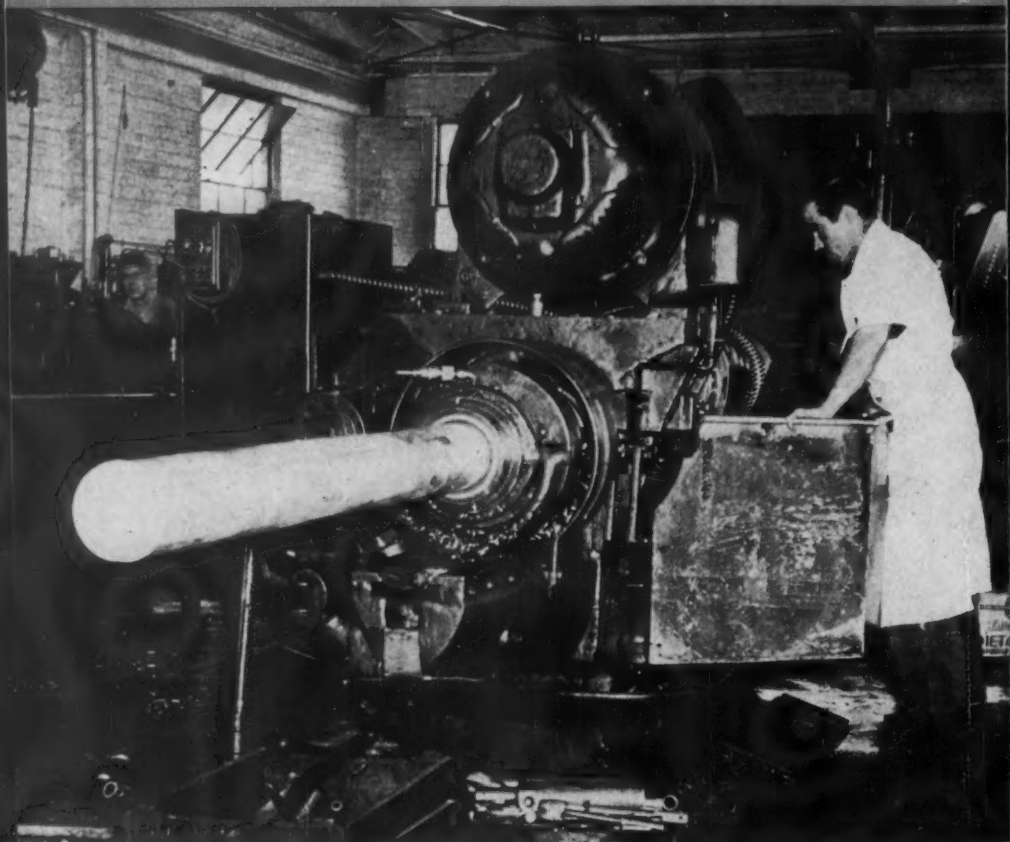
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HOGGING

A Job Shop Specialty

Heavy bars, forgings and rough castings are reduced to easily workable dimensions on large, modified machines by California firm.

By GILBERT C. CLOSE
Field Editor, Modern Machine Shop



Setup for hogging work, using a modified Cleveland automatic turret lathe. Quite often, small parts can be produced economically by performing by cut-off operations on large raw stock.

"Hogging" is a major specialty in the job shop of the H. A. Seele Corporation, Los Angeles, California. Here, on a number of large and usually modified machines, heavy bars, forgings, and rough castings that would defy handling in many shops are reduced to easily workable dimensions and made ready for the final operations that will transform them into critical, closely-dimensioned finished parts. The materials worked include all the common steels, the stainless varieties, Monel, titanium, and on through the ever increasing list of exotic alloys. Though the company is equipped for, and has produced thousands of highly critical finished parts, this particular work is looked upon as a separate facet of the business.

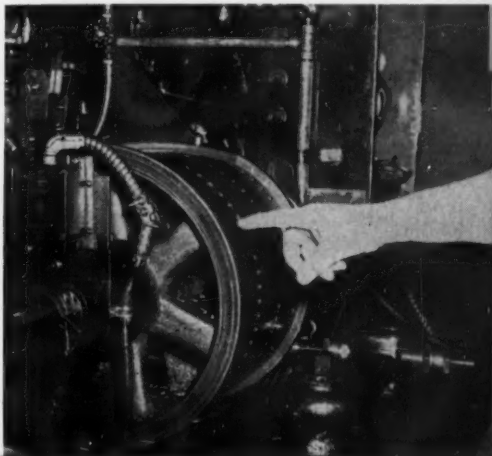
H. A. Seele himself, a machinist-toolmaker since the age of eleven, a tool designer of note, an inventor, still a "shop man" at heart, and a firm believer in the saying that, "... nothing is impossible—it is only new!", points out that effective and efficient hogging work is actually a closed-circuit phase of machine shop operation.

"Good hogging, or first machine operation work, has its own end result," Seele says. "This end result is to produce a part within a part, so to speak. But this inner part must be so located in the hogged part that it can be most easily and accurately obtained during the final machine operations.

"This brings up the subject of tolerances. We do not attempt to approach finished dimensional toler-

ances in most first machine operations. In fact, the opposite is often true. We intentionally leave excess metal so that the part will be easier to clean up in the final machine operations. When a final machinist makes a clean-up cut on one end of a hogged part, he wants to know that there will be enough metal for a clean-up cut on the other end. In other cases, when hogged parts will be heat treated before they are final machined, we leave enough excess metal so that the cutting tool used in final machining will penetrate the tough skin formed during heat treatment. If the cut has to be made within the depth of this skin, the finish machining operation is much more difficult.

"Because of these deviations from finished dimensional tolerances, hogging work is often referred to as a 'roughing' operation. This word is erroneous in its implication. While we do deviate from finished dimen-



The finger points to a cam which serves to keep cutting speed of the lathe constant.

"Hogging work usually involves high tool pressures . . ."

sional tolerances, the amount of this deviation must be extremely uniform in any one batch of parts. In fact, efficient hogging work must maintain a uniformity of tolerance in keeping with the final dimensional tolerances of the part because variations in the first machine operation can easily be reflected in the finished part. Definite location points must be established on each hogged part so that when the finish machinist sets it up, he is sure the 'inner' part lies within the dimensions of his setup."

Seele also explained his theories on tooling for efficient hogging work. "Hogging work should be kept separate from finishing operations," he said. That is why it is handy for many shops to have their hogging work accomplished 'outside'. Hogging work usually involves high tool pressures to force the tool into the work. These pressures are not conducive to extreme accuracy in that they cause work deflection and some distortion in the machine members. The use of the same machine for both hogging and finishing work is not recommended.

"Secondly, an entirely different range of cutting speeds, feeds, and speed controls should be used in hogging work. Because of excessive mill tolerances on large bar stock, and unevenness in large castings and forgings, much of the raw material must be trued before it is set up in an automatic hogging lathe. These truing cuts, performed on a large engine lathe, must be accomplished at a slow speed and with a tool penetration equal to the extent of the unevenness which is being removed.

"After these large pieces of raw material have been trued, they are set up in automatic turret lathes. If the lathe rotates at a constant speed, the actual cutting speed decreases as the tool works toward the center. This change of cutting speed becomes excessive on a large automatic lathe doing cut-off work on 7-inch bar stock.

"For this reason, we power all our big automatic lathes with a motor-generator set and a d.c. drive. This makes constant and stepless speed changing possible. A cam is mounted on the machine to sense the ever diminishing diameter of the work and increase the rotational speed accordingly. Thus, actual cutting speed remains constant from 7 inches down to one inch in diameter. On one big automatic lathe, two speed controls are used—one to continuously adjust rotational speeds, the other to continuously adjust the feed



H. E. Seele holds two parts hogged from raw bar stock similar to that in background.

"... machines for hogging have been modified ..."

rate. Such continuous and stepless speed adjustments, coupled directly to the power source, are not possible when using a.c. drives.

"At other times, we may use this variable feed factor to extend cutting tool life. Any machinist knows that when a tool is used at constant feed, a definite chip flow pattern across the tool results, and that tool wear occurs according to this pattern. One area on the tool may wear down excessively while other areas are unaffected by wear. But when the cutting feed is changed, the chip flow pattern changes also. By varying the cutting feed we establish different chip flow patterns so that wear remains constant on all portions of the tool face. By using these high spots between the valleys, so to speak, tool life can be greatly extended."

Seele points out that most of the machines they use for hogging have been greatly modified. New heads

have been designed and added; belt drives have been replaced; super-precision bearings installed wherever necessary; and, as already noted, d.c. motor drives have been installed.

"This is not due to any fault of the original machine in itself," he says, "but because it is utterly impossible for any machine tool manufacturer to accurately predict all the uses to which his tools will be put. At Seele Corporation, we regard any machine tool as a device for supporting the tools and turning the work. We furnish the 'brains' for the machine in the tooling we design to go with it.

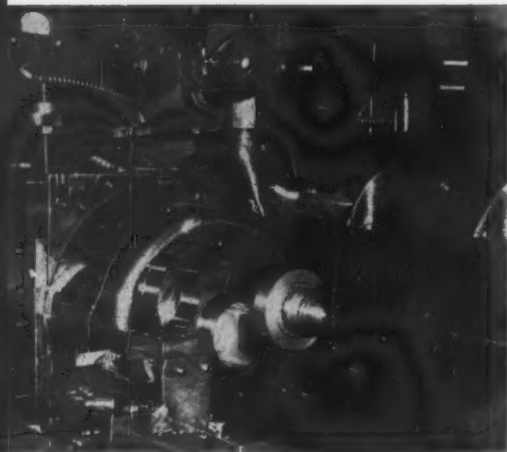
"This practice has two prime advantages. First, the complexity of the tooling, and therefore its cost, can be fitted to the type of work it must perform. We need not pay for a lot of machine-mounted gadgets and variables which we will never use on hogging work. Secondly, in looking upon the machine as only a holding and turning device for the work, any errors that occur will be restricted to the tooling itself, and it's much easier to locate and minimize or eliminate error-producing factors in a small tool than in the machine tool on which it is mounted.

"Because we make our tools the 'brains' of an operation, we use many step drills and similar combination tools wherein the tolerances maintained between two or more simultaneous operations is a function of the tool itself and not the machine in which it is used. This also simplifies subsequent inspection, as when the tolerance of one operation performed by a step drill or other integral com-



A pair of combination tools used to produce the hogged part shown between the tools.

"... handling facilities have to be large ..."



View shows "business" end of an automatic turret lathe, with large raw stock tubing protruding through and with a part just hogged from tubing shown a bit to the left.

bination tool is correct, the others have to be right!"

Seele says also that "the material handling facilities in a job shop doing large scale hogging work have to be adequate and large. Many small parts can be produced most economically by cut-off work on large raw stock, and much of the work received is on large parts which were 'let out' for hogging simply because they were too big and heavy to handle by our customers in the raw stock condition."

To handle these large work pieces, one bay in the Seele hogging shop is equipped with two company-designed traveling cranes which can be used singly or together. Another bay is equipped with a 5-ton electric traveling crane. A hole was cut in one bay wall to facilitate feeding of

large bar stock into one automatic turret lathe. The cranes were designed by Seele himself to give an extra two feet of head room.

"Perhaps the most decisive factors in separating first machine operations from finishing operations is the work that may be performed on a hogged part before it is finish machined," Seele says. "And herein lies many of the advantages that accrue from efficient hogging.

"First, it is practically impossible to heat treat a large piece of raw stock and obtain maximum results throughout. But when a large piece is cut into smaller, semi-finished parts, each of these smaller units will heat treat to an even temper clear through, and the amount of material that must be removed in the hardened condition will have been greatly minimized by prior hogging.

"Secondly, when a complex and critically dimensioned part must be assembled by welding or brazing, it is usually necessary to machine the part after welding to remove the distortion. Here again the amount of metal to be removed during the finishing operation, and often when the part is in a difficult and awkward condition to machine, can be greatly minimized by hogging the part components prior to welding them together, leaving only enough metal for clean up."

Relative to personnel requirements in the hogging division of the machine shop, Seele had this to say . . . "The skills required are different, but of no lesser degree than the skills required for finishing operations. In fact, in some types of hogging work,

more basic shop knowledge may be required. Huge and heavy workpieces must be handled, properly set up in an engine lathe for truing, then properly mounted in an automatic. Cuts and feeds must be adjusted for different types of metals and work. A lot is left to the judgment of the operator. After a part has been properly hogged, the finishing operation may be limited to fixture-mounting it, then pushing a button. The finishing machine takes over from there!"

★ modern machine shop ★

Metals Handbook, 8th Edition, Vol. 1, "Properties and Selection of Metals." Published by American Society for Metals, Metals Park,

Novelty, Ohio. 1300 pages. Price, \$3.00.

Four years in preparation, the new ASM Metals Handbook represents two and a half times as much information on properties and selection of metals as in the last edition. Its 1300 pages include 6707 illustrations, 1841 tables, 2806 definitions, and over 1500 examples and data compilations on 456 alloys.

Major sections of the book cover Carbon and Low-Alloy Steels, Cast Irons, Stainless Steels and Heat Resisting Alloys, Tool Materials, Nonferrous Metals, and special features on magnetic, electrical and other special purpose materials. It also includes a dictionary of technical definitions and special indexes.

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Deep Hole Drilling Missile Parts

The accompanying illustration shows a setup for drilling several holes in valve sleeves used in the servo-mechanism that guides the Hawk missile in its supersonic flight. Extreme accuracy is required. These machines are employed at the Raytheon Company Missile Systems Division plant located at Andover, Massachusetts.

The Pope Super-Precision Boring Machine, product of Pope Machinery Corp., 261 River St., Haverhill, Mass., operates at 1800 p.s.i. and at speeds from 3000 to 10,000 r.p.m., depending on the size of the drill, which may range from 0.100 to 0.750 inch. The table actuating mechanism is electrically controlled. Feed and traverse rates are infinitely variable.

For standard precision boring operations the Pope Model 16-9 is equipped with super-precision type boring heads capable of boring holes round within millionths of an inch.



Setup for drilling holes in servo-mechanism valve sleeves for guiding Hawk missiles.

High Speed Machining-The Answer to Low Cost Production of Non-Ferrous Metal Parts

The information presented here formed the basis of a conference recently held at Onsrud Machine Works, Incorporated.

Would it surprise you to know that high speed machining of non-ferrous metals can improve production efficiency by 1,000 percent. Would it further surprise you to know that this little understood technique is over 20 years old?

The airframe and related industries started using high speed machining prior to World War II. Since this time, it has thoroughly proven itself as a means of securing low cost production with good finish and close tolerance. There are many other industries now using high speed machining methods with great success. They manufacture a variety of products such as appliances, cameras, outboard motors, carburetors, pumps, valves, carbon components, to mention just a few.

Phenomenal production records have been established and maintained wherever high speed machining methods have supplanted older methods. The airframe industry has found it so beneficial that it is now the standard method throughout the industry.

What is high speed machining? Perhaps the answers to a few of the many questions we are asked will ex-

plain the many advantages it offers.

QUESTION: What is meant by high speed machining of non-ferrous metals?

ANSWER: We define high speed machining as a process in which cutter speeds from 5000 to 10,000 surface feet per minute are employed. To reach these cutter speeds, spindle speeds from 1800 r.p.m. to 100,000 r.p.m. are required, depending upon the diameter of the cutter being used. High cutter speeds require proportionately higher feed speeds to maintain a given chip load on each tooth of the cutter. For example, a 6 inch diameter, 8-tooth cutter running at 3600 r.p.m. (5400 surface feet per minute) will be cutting a chip 28,800 times per minute. To achieve a chip load of 0.001 inch per tooth, a feed speed of 28.8 inches per minute is required. A 0.002 inch chip load per tooth requires a feed speed of 57.6 inches per minute and so on up to possibly 0.010 inch per tooth, in which case, a feed speed of 288 inches per minute is required. The maximum thickness of chip depends upon the surface condition desired and the capabilities of the machine and its

tooling, influenced by such factors as rigidity and horsepower.

Since the high frequency of cutting chips results in a high rate of metal removal, the foregoing example clearly illustrates the high productive capacity of the process. There are, of course, practical limitations to the cutter speed, because as speed increases, cutter balance and rigidity of machine and tooling become more critical.

QUESTION: What about tool life in high speed machining?

ANSWER: Tool life depends upon a number of variables, such as the material being cut (die castings, sand castings, extrusions, forged or rolled material, and so on), the geometry of the cutting edge, the rigidity of the machine and the work holding fixture, the method of applying lubricant to the cutter, the thickness of the chip being removed per cutter tooth, the balance of the cutter, and the grade of carbide being used. This does not mean that all these conditions must be perfect before good tool life can be obtained, but each has an effect on tool life, some conditions

being more important than others.

A high speed cutter can be designed to provide cutter life equal to, or better than, the cutter made for conventional feeds and speeds. Tool life should be measured by the number of pieces produced per cutter grind, not in the period of time that the cutter runs. This is important because the vast difference in production does not make time a proper basis for comparison.

Too often, cutter life is over-emphasized. Since parts can be produced many times faster by using high speed machining methods, more than enough money is saved in production time to enable a manufacturer to profitably spend a little more money for cutters and a little more time on their care and grinding.

QUESTION: Do chips weld onto the cutter?

ANSWER: There is no reason to experience this problem in high speed machining of aluminum. Our experience leads us to believe that this problem is the result of excessive heat developed between the cutting edge of the cutter and chip removed.



A group of typical parts which are readily applicable to high speed machining.

"... coolant should be applied on the cutting edges ..."



Illustration showing another group of typical parts applicable to high speed machining.

Heat is not a great problem when machining aluminum at high speeds because it is removed almost as fast as it is generated. To elaborate—when machining at high speeds, the cutter is turning much faster than at conventional speeds, sometimes as much as ten times faster. As a result, a much smaller chip load per tooth is taken, thereby reducing the heat that is generated, while still maintaining a feed speed many times faster than in former machining methods.

While the lighter chip load reduces the heat problem, the main reason for the absence of heat in high speed machining is the short time of contact between chip and cutter. The cut is taken so fast that the chip hardly gets a chance to transfer its heat into the cutting edge before it is thrown clear. When cutting at slow speeds, the chip remains in contact with the cutting edge of the tool for a much longer period of time. This contact period permits the chip to transfer its heat into the cutting tool. It's like picking up a hot potato. If you juggle it from hand to hand, you don't give it a chance to transfer its heat to

your skin. However, if you hold it in only one hand, it will be mighty uncomfortable. The main reason for the extensive use of chip breakers is to get rid of the hot chip.

QUESTION: How about the use of coolant in high speed machining?

ANSWER: Coolant is another aid in minimizing the heat problem and also increasing tool life. The important factor in using a coolant is the way in which it is applied and not the amount used nor even the type.

It is not the primary function of the coolant to take the heat out of the chip because the chip is thrown clear of the work and the cutter. Therefore, a large volume of coolant is not needed to put out the "fire."

Instead, coolant should be applied where it is going to do the most good, and that is on the cutting edges of the cutter. Only a thin film of coolant is necessary to reduce the friction of the chips sliding over the face of the cutting tool. Also, the thin film of coolant acts as an insulator to further reduce the transfer of heat from the chip to the cutting edge of the cutter during the actual cutting process.

The best method for applying coolant accurately and effectively is to use several small high pressure jets spraying at the cutting edge of the cutter from several points around the periphery of the cutter. A pressurized mist-coolant system is the best for this because it will eject a fine spray at a high velocity. The spray must have sufficient velocity to pierce through the turbulent air the cutter creates when running at high speeds.

If the coolant is applied in the proper manner, a small amount will go a long way and the shower that goes along with a large volume of

flood coolant is entirely eliminated.

Producers of non-ferrous metals are enthusiastic about the tremendous possibilities of high speed machining. It provides the answers to many of the problems of manufacturers who desire to step-up production and improve product finish. Also, because of its labor savings, it is another important selling point in justifying the use of aluminum and other non-ferrous metals in a product.

To those industries where volume production of non-ferrous parts is essential, this method offers an entirely new concept in manufacturing.

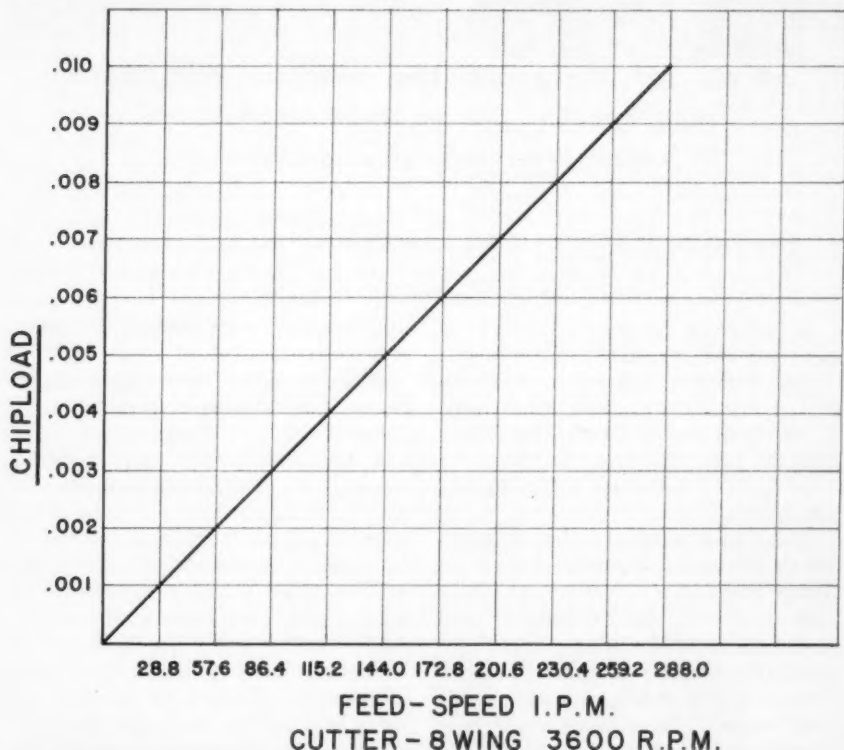


Chart showing relationship between "Chipload" and "Feed-Speed in Inches per Minute."

What Constitutes a Good Power Press



**Safety for the press, the operator and those
who service the equipment must be
engineered into the equipment.**

By J. H. GREENOUGH

Plant Manager, Chevrolet—Indianapolis Division, General Motors Corp., Indianapolis

A safety program for a pressed metal plant cannot be designed and put into effect, thinking that it will carry on indefinitely and be as effective as it was the day it was conceived and put in operation, so we must be ever alert to improvement possibilities.

If, by some magic of photography, we could make a composite of all safety programs, it would be found that many of the mechanical and electrical devices and techniques in general would show remarkable similarity. *In this statement I have reference to such items as standard type guards, custom-built guards, control buttons, shields, lights and many*

other items, even including safety practices.

Since a large percentage of the plants both inside and outside the General Motors Corporation have had the devices and techniques mentioned, but still had improvements to make in their safety position, it became obvious that there are other ingredients essential to a successful and effective safety program. So to speak, such items as those enumerated previously are the tools which must be used skillfully and judiciously to achieve the desired and necessary results to assure safe conditions for man and press.

Before discussing the points I have

alluded to in my opening comments, I would like to lay a brief background for my remarks. All through my years with General Motors I have been intensely interested in safety, but I believe that my greatest understanding and devotion to safety has come in my present position. *I have been brought closer to the real meaning of having a press safe for an operator and having an operator ready to operate a press.*

At Chevrolet-Indianapolis we have about 500 presses ranging in size from a 26-ton open back inclinable about 7½ feet high, to a 2500-ton double action drawing press which stands over 36 feet high and is one of the largest presses, in terms of die area, in the world.

This equipment in the pressroom of our plant, which is a typical pressed metal production plant, varies in age from some which were built in the days when only mechanical clutches were used, to the most modern press with air clutch, counterbalancing cylinders and other features for the best in safe operation.

In addition to the old and new categories of pressroom equipment, we must include still another category which is, perhaps the most important one for our consideration today because it affects the future of all of us in the pressed metal business. It is the group of presses on which we will be requesting quotations tomorrow.

With these comments and statements as background, I would like to start my message to you by discussing some of the engineering aspects of a good pressroom safety program. The group of presses for which we will be writing specifications "tomor-

The Author



J. H. GREENOUGH started with Chevrolet-Flint on January 6, 1928 as a diemaker, coming up through supervision in die room to Superintendent-Tool Room, Production Superintendent, General Superintendent-Production and Master Mechanic at the Motor Plant, Master Mechanic Chevrolet Aviation Engine Plant in Buffalo, and then returned to Flint as Master Mechanic of the V-8 Engine Plant. He was promoted to Plant Manager of the Chevrolet-Indianapolis Division on April 1, 1956.

row" is extremely important because it provides our best opportunity to engineer safety into our equipment rather than, figuratively speaking, to "hang-it-on" as is necessary on older presses and even in the case of some of the presses we would place in the "new" category.

In order to accomplish the type of progressive safety program implied by the statement "that safety for the press, the operator and those who service the equipment must be engineered into the equipment, rather

"... each must be safe for the other ..."



"... I have reference to such items as guards, control buttons, shields, lights and many other items, including safety practices."

than 'hang-it-on,'" it was imperative that uniform standards for safety practices be established. The standards provided a reference for use in the development and operation of a safety program.

An important and essential characteristic of uniform standards is that they must be of a nature and controlled flexibility so that they can be applied to a wide age range of presses. Generally speaking, nearly all productive pressroom set-ups involve controls, guards, dies, special mechanical handling devices of various types, and each may require special maintenance and repair procedures; but all equipment must have one thing in common: the relationship between the equipment and the human being—each must be safe for the other.

At this point I want to emphasize the fact that all of the components of

a productive set-up in a pressed metal plant are of extremely good economic and humane importance. A sound safety program must protect our investment in equipment by permitting the maximum utilization of equipment with a minimum of lost time by the operator or other people concerned. In a great many pressrooms the diesetter or jobsetter is the person responsible for the relationship between the press, the die and the operator. The press and die generally add up to several thousands of dollars, and we cannot place a price on the human being who depends upon the equipment for a living.

Chevrolet has had a wide and varied experience in the field of pressroom safety. In some instances our experience has been costly, but we have always profited by it. I am certain that I do not have to relate them in detail to support the need for the *engineering approach* to pressroom safety.

When the Chevrolet Manufacturing Practices Committee directed its attention to press standards, safety became paramount and work was started on the preparation of new "Chevrolet safety standards for sheet metal power presses." At the onset of the project by a task group on press standardization, the safety considerations were directed to new presses, but it was soon discovered that the course of the project's objectives had to be altered in such a manner as to encompass *new* and, in addition, the modification of any *existing* pressroom equipment.

Hence, the safety practices developed and compiled are now presented

in two parts. Part I covers requirements for new power presses:

- a. Safety—Power press
- b. Safety—Electrical
- c. Safety—Air controls and piping
- d. Safety—Lubrication

Part II covers pressroom procedure for mechanical presses:

- a. Press controls
- b. Die guards
- c. Die blocks
- d. Press maintenance platforms and ladders
- e. Press operators' platforms
- f. Procedures for use of safety tags
- g. Use of personal safety padlocks
- h. Special control devices for air
- i. Pressroom cranes

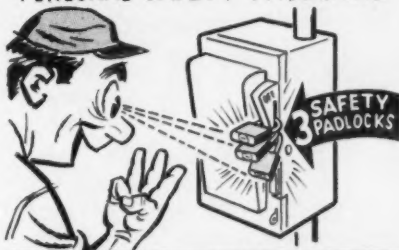
Safety specifications for each of the items listed in Part I were developed over a long period of time by specialists in the indicated fields. The specialists are those who are in constant contact with the safety problems in the pressroom and those who engineer and build the equipment. In other words, we at Chevrolet have



"... it provides our best opportunity to engineer safety into our equipment rather than, figuratively speaking, to hang-it-on . . ."

SAFETY

MASTER DISCONNECT PANEL
WITH PROVISIONS FOR **THREE**
PERSONAL SAFETY PADLOCKS



in Pressroom Procedure

"... use of personal safety padlocks . . ."

not arbitrarily set standards without the experience and acceptance of those who will have to use the standards for our pressroom safety program.

The manufacturers of power press equipment have certainly met the challenge for engineering safety into their products: (1) enclosed presses to eliminate hazards of open type gears; (2) new developments in clutches and brakes; and (3) new type valves and controls to eliminate repeats.

They have revised *their* standards to insure *safety*.

The application of standards will vary somewhat among our major pressed metal plants because they have slightly different conditions in regard to product, personnel and type of presses. The important principle, however, is that the standards are stated and defined for reference purposes as a result of experience.

In Part II, the same principle can be applied to the items listed with even greater import because people, you and I, are directly affected. First,

"... management must set the example ..."

in order to effectively communicate with others—safety personnel, supervisors and production operators—it is essential that all terms be defined using a "language" which is understandable and concise. And, in a second category, clarity and accuracy of communications are essential to the promotion of program uniformity and for effective safety training. The National Safety Council and more specifically the authors and contributors of the latest issue of the *Power Press Safety Manual* are to be commended for their farsightedness in preparing such a manual. Work of this type is a valuable reference for all press users in the development of a safety program keyed to their particular plant needs.

I would also like to point out and emphasize that when a safety program is being developed or evaluated for a plant, those responsible for the

content must recognize that many of the items listed, especially in Part II, are deep-rooted in the organization. For example, a die block is not just a piece of cast or wrought material of a certain size, but it is a detail which has perhaps affected press design and certainly die design. Obviously, then, the most effective safety program is one with safety standards which have resulted from a collaboration of specialists such as the die designer, the press designer and the safety engineer.

This way of thinking, I know from experience, applies to types of manufacturing other than pressed metal, and certainly the basic principles and objectives are the same.

The quality of the foundation for an effective safety program in a pressed metal plant cannot be based solely upon the number of presses meeting safety specifications, the number of dies that are properly guarded or by the number of operators wearing recommended protection for eyes, hands or feet. There is another ingredient which, like the warp of a carpet, must be in evidence to hold a safety program together and make it work. I refer to *attitude*: not the attitude of everyone else, but management's attitude, because management must set the example for all levels of supervision in the plant.

If a *healthy safety attitude* permeates a plant, there might be accidents, but they will not be because any employee was knowingly allowed to work in an unsafe condition.

If a *healthy safety attitude* exists, there is never any question whatsoever about the importance of safety



"... safety program cannot be based on number of dies that are properly guarded or by number of operators wearing recommended protection for eyes, hands or feet."

for man and machine versus the importance of production.

If a healthy safety attitude exists in a plant, it can be easily detected because the good (or bad) attitude of a supervisor or his employees is a reflection of top management.

I have already offered one way, and perhaps the best way, of achieving the goal of having a healthy safety attitude—that of setting a good example. This approach can be greatly magnified through regularly scheduled meetings with the line and staff supervision so they, in turn, can reflect a constructive safety attitude to their employees. Safety discussions with employees, in addition to basic safety talks, provide the intimate opportunity to develop a safety consciousness within a production operator which, in many cases, is carried into the home.

We have completed a project on press control buttons at the plant which has had a remarkable effect upon our safety record. If you recall, our presses cover quite a range of ages, so some have mechanical clutches and the newer ones have pneumatic clutches which are inherently safe. The objective of the project was to completely eliminate all foot treadles as are used for the mechanical clutch operations and *provide all presses with palm buttons arranged to meet safety specifications for the operation.*

The results of the project which have been rewardingly gratifying are a net increase in productivity and the lack of the common tendency to lock-out a button by some mechanical means. I sincerely believe that there are two reasons for the success of the program: a good general attitude of



"... the attitude of a supervisor or his employees is a reflection of top management."

acceptance, and acceptance made possible by the cooperation of safety engineering with methods engineering.

However, I must hasten to warn you that the application of a "palm button" program in one instance to solve certain types of safety problems might not be suitable for conditions in another. Hence, I want to recommend the well-tested *difficulty—cause—remedy* approach to the solution of safety problems which occur sometimes even after the best of engineered safety. Be certain that the cause justifies the remedy; *never* prescribe a *remedy* without determining the *cause of the difficulty*.

I would like to place emphasis on the importance of having a high degree of cooperation between the safety and methods engineer. A *good method* is a *safe method*, but all plans and devices for safety are not always sound methods-wise. *The improper placing of a palm button or buttons, for example, could cause the operator to employ a motion path which would move him into a hazard-*

"... injuries are caused by human failure ..."

ous or awkward position. In our pressroom safety program we make every possible effort to design such conditions out early in the model year.

I place very strong emphasis on the importance of engineering safety into pressed metal equipment, but let's keep this in mind:

The best engineering minds are not a substitute for one's proper mental attitude when at the controls of a machine! An unbelievably large percentage of the injuries are caused by *human failure* rather than mechanical failure.

I have discussed the importance of engineering safety into pressroom operations, and I have tried to express some of my thoughts on attitudes in safety. In our plant, and I am quite certain that in many others, safe operation just doesn't happen without training. Neither does the fact that a plant has a training program give proof that the desired results are be-

ing obtained for man and machine. Training must be done to solve specific problems and to assist in meeting certain objectives.

In our plant we like to use the well-known training formula as an aid to determining our training needs:

What the job requires minus what the operator knows equals the training needs.

The necessary information to satisfy the first term of the equation comes from the standard safety practices listed earlier in my talk. The information on what the operator knows about the safety requirements for the job can be determined by questionnaire check sheet or interview. Obviously, the training need is the difference between the two terms.

The training to get the necessary safety information firmly fixed in the mind of the operator may be a discussion, or it may be a class for a group of operators or diesetters.

When training needs permit a class for a group, there is the advantage of being able to bring people from related departments into the discussions. For example, when a safety situation involves the press or the die, it is most effective to have specialists available for a two-way flow of information.

The diesetter in some plants has the responsibility for assisting the foreman in preparing the operator for a certain operation in addition to the actual arrangement of the productive set-up. Hence, the selection of the diesetting personnel is of tremendous importance in light of his responsibilities to man and press.

I have tried to acquaint you with



... provide all presses with palm buttons arranged to meet safety specifications ..."



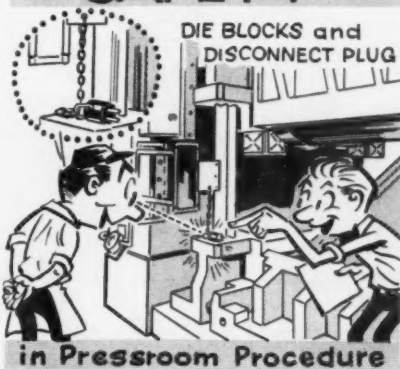
"The improper placing of a palm button could move him into a hazardous position."

what I believe are some of the essential ingredients of a good power press safety program. I would like to summarize the message by excerpting the key points of this presentation. These are the key points:

1. We must be ever alert to safety improvement possibilities.
2. Standard safety devices are only tools which must be skillfully and judiciously used to achieve the desired safety results for man and machine.
3. My real understanding of safety has come in my present position.
4. The presses we will be specifying tomorrow are the ones that affect the future; they provide our best opportunity to engineer safety into equipment.
5. Uniform standards provide a reference for development and operation of safety programs.
6. Equipment and the human being must be safe for each other.
7. All terms of safety must be defined for better communications at all levels.
8. Sound safety programs result from the collaboration and co-operation of specialists.
9. A healthy safety attitude must permeate the entire plant.
10. When a healthy safety attitude exists, there is never any question about the importance of safety of man and machine versus the importance of production.
11. A safety technique suitable in one instance might not be adequate for conditions in another.
12. Use the Difficulty—Cause—Remedy approach in the solution of safety problems.
13. Methods and safety engineers must cooperate closely; a good method is a *safe* method.
14. Good engineering is not a substitute for one's mental attitude.
15. Use the training formula: What the job requires minus what the operator knows equals the training needs.

(Editor's note: The foregoing information was presented as a talk at the recent National Safety Congress.)

SAFETY



"... the selection of the diesetting personnel is of tremendous importance ..."

Simple Die Forms Beaded Channel

Die features swing plates which are grooved to form the beads.

By L. KASPER

The drawing shows a simple die which is designed to form a blank into a channel shape with beads on two sides, as shown at W in Fig. 2. This type die was constructed because the small quantity

of parts required did not warrant the cost of a die with cam-operated slides. Referring to the drawing, the block, A, is mounted on the bolster plate of the press, which is equipped with a pneumatic pressure cylinder,

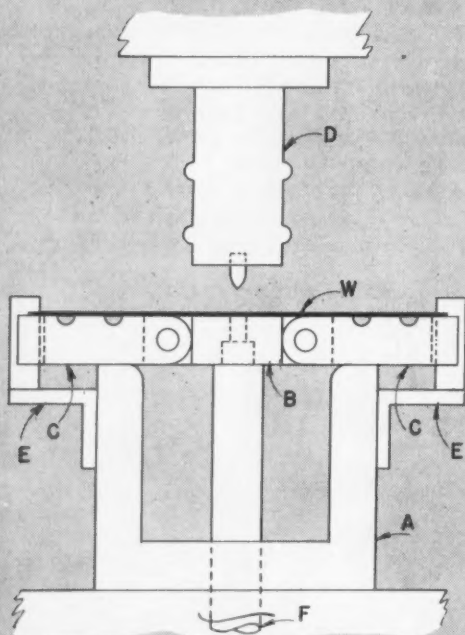


FIGURE 1.

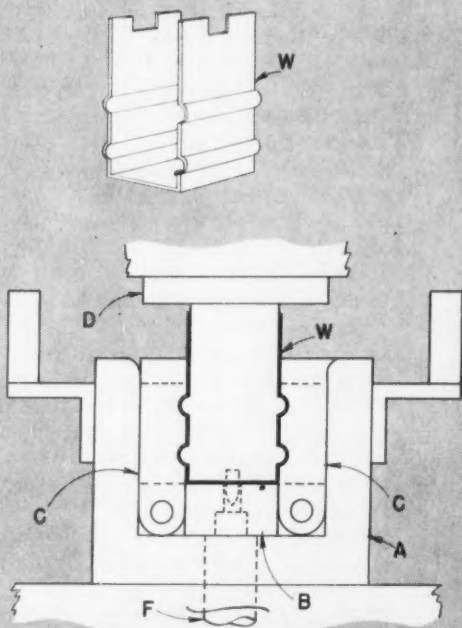


FIGURE 2.

Drawing showing a simple die which is designed especially for forming beaded channel.

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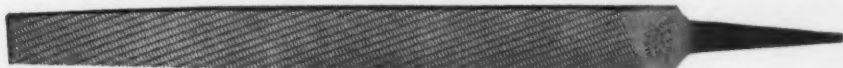


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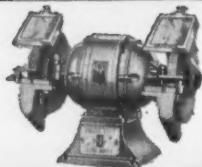
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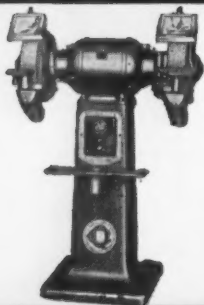


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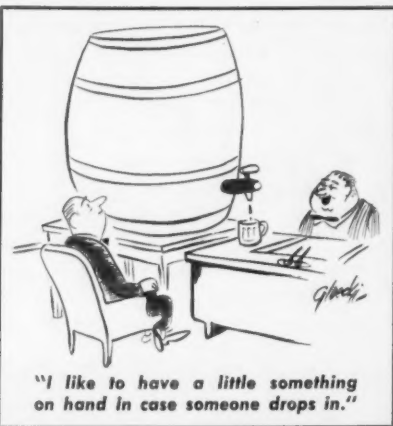
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Die Forms Channel . . .

the piston, *F*, of which is attached to the block, *B*. Block, *B*, carries two swing plates, *C*, which are grooved to form the beads. In operation, blank, *W*, is located on the top of the die, as shown in Fig. 1, with the two guides, *E*, engaging the end slots of blank, *W*. Punch, *D*, attached to the ram, carries a pilot pin which enters the hole in the blank for accurate positioning and to prevent initial slippage.

In Fig. 2, the ram is shown at its lowest point. As block, *B*, is forced into the die, the swing plates, *C*, are caused to swing upward due to contact with the rounded internal edges of block, *A*, closing in gradually as the ram descends, so that at the bottom of the stroke, the piece, *W*, is completely formed. This die creates a desirable forming action in that the channel is formed by folding, with no drawing action on the corners. As the ram ascends, the piece, *W*, is carried upward with the punch, *D*, and is stripped off manually.



May, 1961

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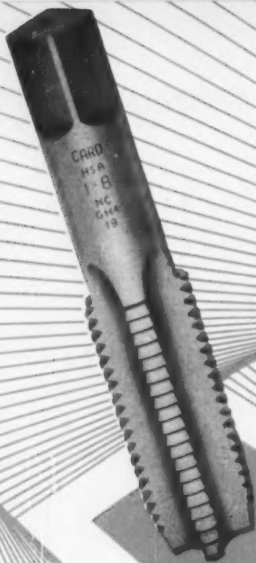


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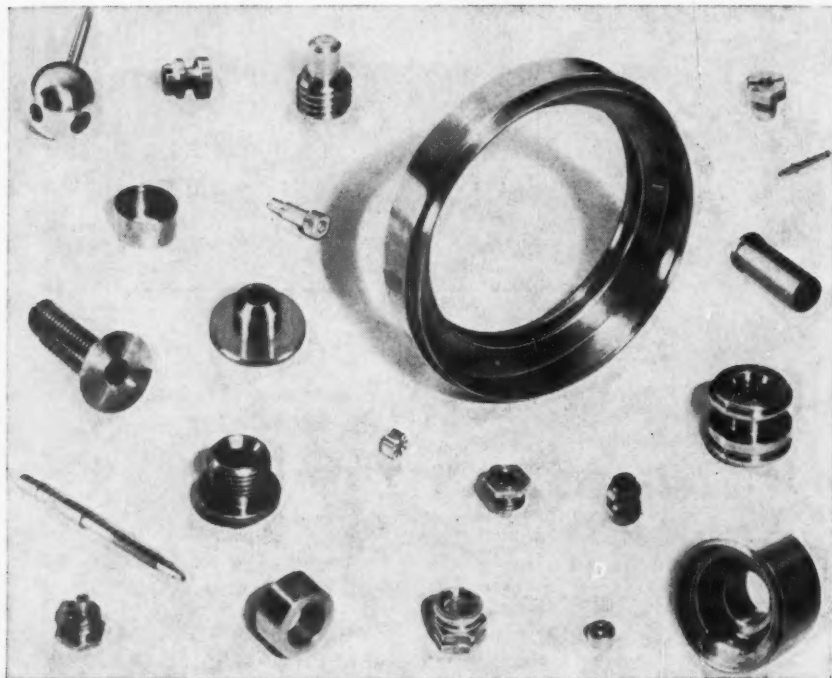
Faster Machining Stainless

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Few developments of new materials in recent years have attracted as much attention as the new free machining chromium-nickel stainless steel, designated Uniloy 303 MA, recently announced as being commercially available by Universal-Cyclops Steel Corporation, Bridgeville, Pa. This new grade is claimed to be one of the most important developments in free machining stain-

less steels since they were developed over 25 years ago.

The greatly improved machinability of Uniloy 303MA permits increased output of machined parts and longer tool life, resulting in considerable dollar savings. In addition to important dollar savings in production costs, Uniloy 303MA has a great many other plus values in the characteristics of finished parts such as



Variety of screw machine products made of free machining Uniloy 303MA stainless steel.

Typical Composition Analysis

	Uniloy 303MA	Type 303
Carbon10	.10
Manganese	1.50	1.50
Silicon50	.50
Sulphur13*	.25*
Chromium	18.00	18.00
Nickel	9.25	9.00
Molybdenum50	.50
Aluminum70*	—*

*Significant Variations in Chemical Analysis

high corrosion resistance and surface finish.

It is estimated that the potential market for Uniloy 303MA is 25 million dollars per year. Most of the demand for this new alloy will probably be in the form of cold finished bar. The demand for cold finished stainless bars has been growing at a more rapid rate than stainless steel as a whole during the past 15 years. This accelerated growth is expected to continue during the next five years.

The difference between Uniloy 303 MA and regular free machining Type 303 is in the analysis. In Uniloy 303 MA the combination of aluminum and sulphur additions for better machinability makes possible a reduction in the sulphur content to about one-half the level normally contained in Type 303.

The addition of significant quantities of sulphur to stainless steels for improved machinability actually results in undesirable side effects. The sulphur content takes the form of non-metallic stringers and inclusions, which adversely affect the fab-

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Uniloy 303MA is a product of Universal-Cyclops' continuing research and development program. It was first produced in relatively small quantities and subjected to extensive testing not only in our own laboratories, but also in leading independent and university laboratories. The favorable results of these tests led to the production of large quantities of this grade to prove out processing and reproducibility.

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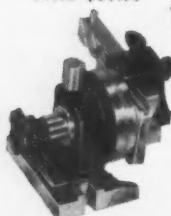
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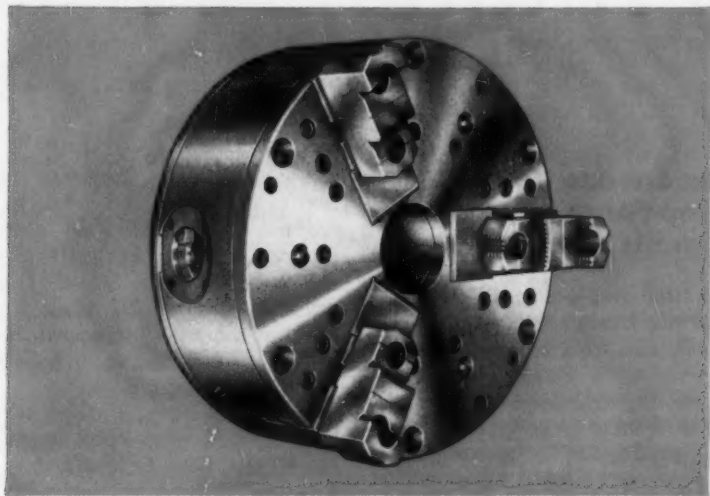
tool life and less down time for changing tools.

The new material can be electro-polished to a very high lustre resembling the best results obtainable with low sulphur stainless steels. Uniloy 303MA can be satisfactorily arc welded, flash welded, percussion stud welded and brazed when proper techniques are used. The development and introduction of new free machining Uniloy 303MA is another accomplishment for Universal-Cyclops Steel Corporation in the production of better steels for better products.



May, 1961

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MODERN MACHINE SHOP 143

»» MORE PRODUCTION

Miller Speeds Duplication of Drop Forge Die Through Automatic Scanning

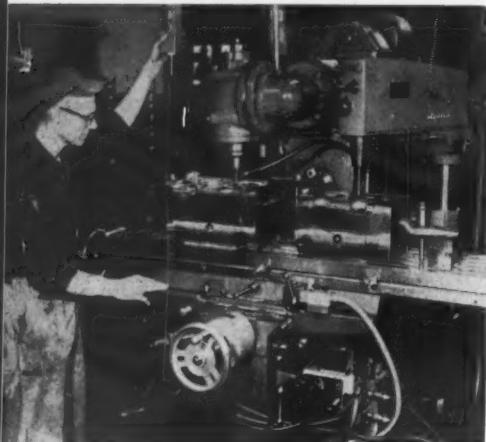
The fast and accurate duplication of die blocks made possible by automatic scanning is evidenced in a job involving a Greaves Scan-O-Matic milling machine and the duplication of a drop forge type die used in the production of suspension hooks. A complicated, costly and time consuming process by conven-

tional procedures, accurate duplication of the 10 x 10 x 14-inch die of Heppenstall Hard Tem steel was accomplished economically in just a few hours by the Scan-O-Matic miller, a Model 2H plain Greaves milling machine equipped with a universal toolmakers overarm and Scan-O-Matic duplicator.

In producing the aforementioned finished die from the master die block, the Scan-O-Matic duplicator was used in conjunction with three sizes of ball type end mills in the universal toolmakers overarm, a 3 h.p. unit affording 8 spindle speeds ranging from 175 to 1750 r.p.m. The spindle itself has a No. 50 standard taper—the same as the horizontal spindle, thus minimizing cost of tooling in subsequent work.

The rough machining of the die block was done to a depth of $\frac{1}{4}$ inch using a $\frac{5}{8}$ -inch diameter ball end mill at a spindle speed of 640 r.p.m. feeding at a rate of 12 inches per minute through action of the hydraulic table. Pick feeding in this phase was at $\frac{1}{32}$ inch on each pass of the table.

For finish machining of the die a $\frac{1}{4}$ -inch diameter ball end mill was used at a spindle speed of 800 r.p.m., cutting $\frac{1}{16}$ inch deep while pick-feeding automatically 0.010 inch on



Scan-O-Matic miller setup used in producing a drop forge die from master die block.

MODERNIZATION THROUGH

each pass. Two pockets in the die block required use of a 3/16-inch diameter ball end mill running at 1200 r.p.m., 1/16 inch deep, with pick-feed operating at 0.0025 inch on each pass.

For more data circle 1 on Postpaid Card

★ modern machine shop ★

Versatile Setup Increases Pillow-Block Production

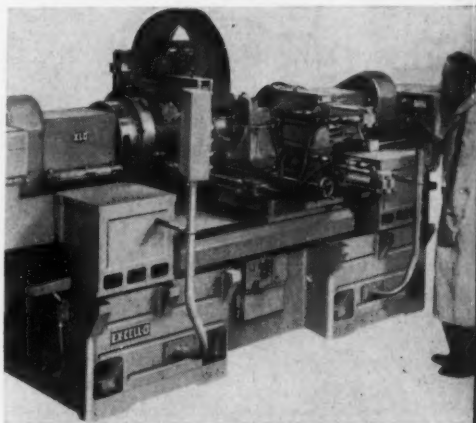
Some 47 different sizes and configurations of heavy-duty pillow-blocks are accommodated in the versatile fixturing on the Model 772 precision boring machine shown here, recently built by Ex-Cell-O Corporation, Detroit, Michigan. By engineering multiple operations in this manner, machining costs have been sharply reduced over the previous method of using several machines engaged on individual operations. Handling time and the resultant fatigue involved are both drastically reduced. Even more important, product accuracy is considerably improved due to all operations being performed at one setting.

Two standard Ex-Cell-O heavy-duty precision spindles carry a minimum number of interchangeable boring quills. One common fixture

base accommodates several easily changed sub-fixtures. The clamping arrangement is also common, it being necessary merely to adjust the set of clamps for each run of different parts.

In operation, the bottom half of a pillow block is loaded, and the machine table is traversed to the left where the top section of the pillow block is clamped into position. Boring then commences. A reversal of the order of these preliminary operations permits the machining of the other end of the pillow block.

For more data circle 2 on Postpaid Card



Ex-Cell-O Model 772 precision boring machine set up for producing cast-iron pillow blocks.

more production . . .

Vertical Mill Provides Economy in Repairing and Rebuilding Compressors

Engaged in the business of repairing and rebuilding compressors ranging in size from $\frac{1}{4}$ to 100 h.p., Crawford Compressor Service recently purchased a U. S. Millrite, a full size dovetail ram and turret vertical mill manufactured by The U. S. Burke Machine Tool Division, Cincinnati, Ohio, which is used in producing the many and varied parts needed for replacement on obsolete compressors. This identical duplication of original parts requires tolerances up to plus or minus 0.0005

inch. Crawford also used the Millrite in making tools and dies for use in its own shop.

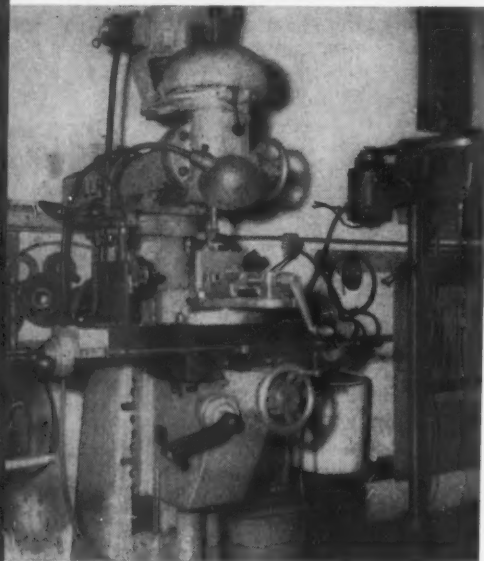
Of particular advantage in Crawford's work is the Millrite's compound swivel head which provides for double angle settings. Contributing to the Millrite's accuracy and rigidity is the manner in which the head bolts to the ram. The overhang of the head is minimized, so that its balance is not affected.

Typical operations performed by Crawford involving use of the Millrite include building up and machining crankshafts, milling keyways, undercutting and spotfacing valve seats. In addition, Crawford removes damaged seats with counterbores; new inserts are then installed and milled. Spindle speeds of the machine range from 250 to 3400 revolutions per minute, using the Millrite's standard 1200 r.p.m., $\frac{3}{4}$ h.p. motor. Feed of the machine is operated by the hand method.

Crawford's operations involve holding small pieces in the milling machine vise; large parts are clamped directly to the table, which has a working surface 7 x 27 inches. Some parts, like valve plates, that are too large for openings in the vise are bolted to a jig made of a square $\frac{3}{4}$ -inch bar of cold rolled steel which is clamped to the table of the milling machine.

Crawford has exercised additional ingenuity in producing "home made" fixtures for its Millrite. One such fixture is an adjustable center for steadying long crankshafts for key cutting. Other accessories used by Crawford are collets, boring head, and drill chuck.

For more data circle 3 on Postpaid Card



View of Millrite setup used by Crawford Compressor Service in repairing compressors.

6-12

DE LUXE SURFACE GRINDER

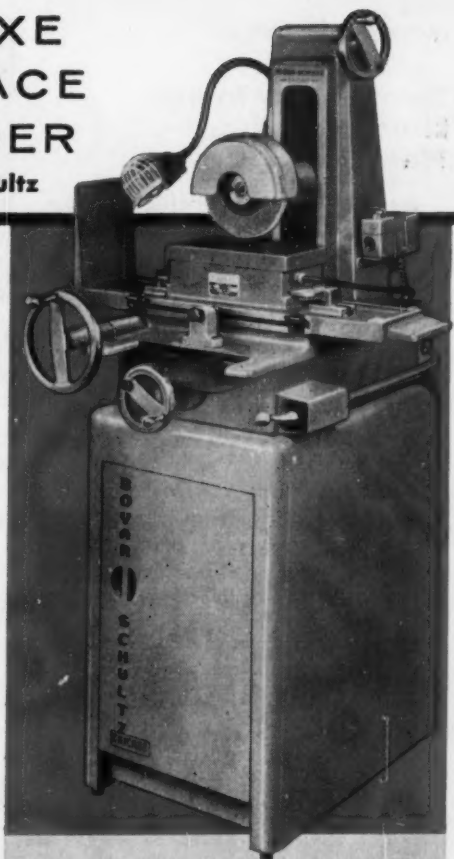
by Boyar-Schultz

A De Luxe Boyar-Schultz Surface Grinder incorporating many new accessories for those who want the ultimate.

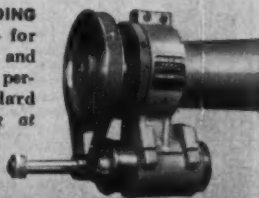
FEATURING

- AUTOMATIC OILING SYSTEM. A motorized lubrication system providing continuous flow of lubrication to all bearing surfaces.
- OIL HARDENED AND GROUND tool steel inserts on saddle ways.
- NEW WHEEL GUARD to accommodate an eight inch grinding wheel.
- SLIP RINGS ON HAND WHEELS for vertical feed and cross feed permit the graduated dials to be set at 0 or any other desired graduation.
- NEW HEAVY DUTY BASE with welded structural steel inner frame for maximum rigidity and increased weight. Also available with patented built-in dust collector.

6-12 De Luxe Surface Grinder is available with hand or hydraulic feed.



HIGH SPEED GRINDING ATTACHMENT — for grinding angles and slots too small to permit using standard wheels. Available at additional cost.



Boyar-Schultz Corporation

2020 SOUTH 25TH AVENUE, BROADVIEW, ILLINOIS

For more data circle 426 on Postpaid Card

more production . . .

Throw-Away Inserts Effective in Armor- Plate Turning

As part of an overall program aimed at cost reduction, Iowa Manufacturing Company of Cedar Rapids conducted a series of tests on turning the OD's of carrier sprockets made of cast-steel armor plate with a hardness of 25-32 Rc. Results of the tests show that throw-away inserts can handle such operations effectively and lead to cost reduction.

Cutting conditions for various combinations of carbide grades, and styles and makes of holders were held constant: cutting speed, 200 s.f.p.m.; feed rate, 0.011 i.p.r.; depth



New Wesson throw-away insert holder takes 1/4 inch cut at the rate of 200 s.f.p.m. on a cast-steel armor plate sprocket wheel.

of cut, 1/4 inch plus; length of cut, 3 1/2 inches, and machining time, 5 minutes. All cuts were taken with a copious flow of soluble-oil coolant.

Not only did the tests show that throw-away inserts can do this job, they also indicated that comparative testing can lead to significant savings, especially on tough jobs. Average production with the six cutting edges of the triangular inserts tested was 24 sprockets, representing an insert cost of 7 cents per piece. Best results were obtained with a new style Wesson T-A Holder and Wesson-metal HR (heavy-roughing grade) carbide. This combination averaged 42 parts per insert and dropped insert cost per sprocket to about 4 cents. For more data circle 4 on Postpaid Card


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Motor Shell Manufacturing Automated

The unusual motor shell welder shown herewith is installed at the Belfontaine, Ohio, plant of Westinghouse Electric Company where it forms and assembles a variety of shells which Westinghouse



GEAR RACK



The high degree of accuracy and finish we have been able to achieve has given us a position of unquestioned leadership in the gear rack field. Our specially designed machines and the skill of our expert craftsmen enable us to cut rack from almost any size blank in a wide variety of materials and in almost any pitch and length. We will be happy to analyze your rack requirements and send you a prompt quotation.

Send for our new catalog which gives information on Woodruff keys, taper pins, machine keys, and features a chart for checking gear racks.

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Plant: Beaver Falls, Pa.; Hammond, Ind.

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**Up to 150
Strokes Per Minute...
NEW DI-ACRO OPEN BACK
INCLINABLE PUNCH
PRESS NO. 5**

This new bench type punch press has five tons of power for punching, forming, shearing, marking, riveting, staking or embossing. Single stroke cycling, 150 s.p.m., or continuous operation, 210 s.p.m. Deep 12 inch throat allows working to center of 24" sheet. Spring loaded material stripper—easy to set up—ideal for women operators or inexperienced help. Standard equipment includes motor, brake, flywheel guard, all electrical connections, punch holder, stripper assembly and die holder.

PRECISION PUNCHES AND DIES—
Over 500 sizes of single station Di-Acro punches and dies are available from factory stock, plus adjustable punches and dies for multiple punching in one operation.

See Di-Acro Machines in Action at ASTE Show, Booth 1404, Coliseum, New York City, May 22-26, 1961

For more data circle 428 on Postpaid Card

HAND OPERATED PUNCH PRESSES

—Di-Acro Punch Presses No. 1 and 2 both provide 4 tons of power that will punch holes up to 4" round in 16 ga. mild steel using punches with shear. No. 1 has 6 1/4" throat depth and No. 2 a 12 1/4" throat depth. Both models come with short handle, long handle for heavier materials, punch and die holders, turret stripper; back and side gauges.

Consult the yellow pages of your phone book under Machinery: Machine Tools for the name of your nearest distributor or write us.



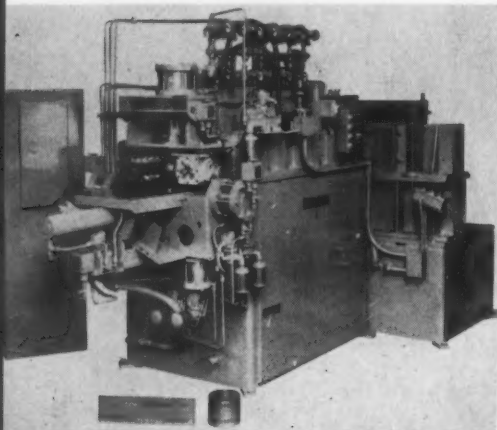
See complete Di-Acro line in Sweet's Machine Tool Catalog

pronounced
"die-ack-ro"



DI-ACRO CORPORATION
formerly O'Neil-Irwin Mfg. Co.
755 8th Avenue
Lake City, Minnesota

more production . . .



View of Precision automatic mash seam welder for welding electric motor shells. Machine, which includes a 200 Kva. transformer, magazine feed, transfer, rolling mill and stripper mechanism, is installed at the Belfontaine, Ohio, plant of Westinghouse.

uses for fractional-horsepower appliance motors. Built by Precision Welder and Flexopress Corporation of Cincinnati, the machine takes a stack of slotted steel blanks, rolls them into cylinders, welds them in exact circumference, and ejects them at a rate of 420 per hour.

Cut blanks are loaded into a magazine which feeds them from the bottom of the stack into a roll forming mill. After the mill has formed the blank into a cylinder, an air-operated transfer mechanism shuttles the shell to the weld station. Air-operated, wrap-around clamps mold the shell firmly to the welding arbor and carry current as a rocker-type, anti-friction head mash-welds the seam. Then the clamps relax and the welded shell is automatically ejected

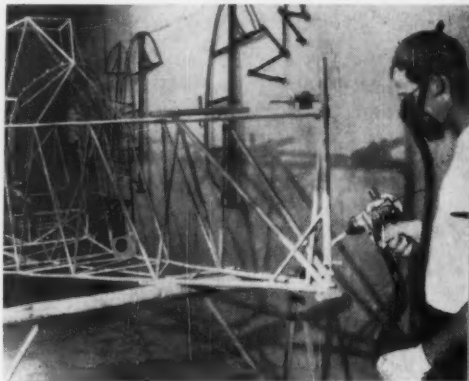
from the arbor into a discharge chute. Clamps and arbor are adjustable for various lengths of shells. For more data circle 5 on Postpaid Card

★ modern machine shop ★

Metallizing Corrosion-Proofs Plane Components

After years of severe testing, Piper Aircraft selected metallized zinc as affording optimum protection for its "Pawnee," made especially for crop-dusting and chemical spraying. The process is also used on Tri-Pacers slated for salt water use or export, for protection against intensive damage from the sea or high humidity climates.

In addition to the 430 feet of steel tubing in the fuselage of a Tri-Pacer, most of the plane's component parts are also flame sprayed with zinc. These include motor mounts, blocks, spacer tubes, clamps, struts, fins, and so on. The only preparation required is degreasing and light sandblasting. For more data circle 6 on Postpaid Card



Corrosion-proofing the fuselage of a Piper "Pawnee" by metallizing with pure zinc.

IT'S A FACT!

DRILLHEADS ARE OBVIOUS.

Tremendous economies from the use of multiple-spindle drillheads are obvious. Drilling one hole at a time cannot be tolerated in this day of automation!

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Drillheads
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1. They are better built and cost no more (Full ball bearing construction, hardened gears, spindles and driver, and precision grinding!)
2. This means they last longer
3. This eliminates down time
4. This eliminates production losses
5. This drastically reduces drilling costs

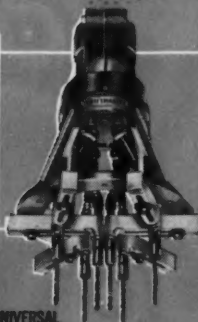
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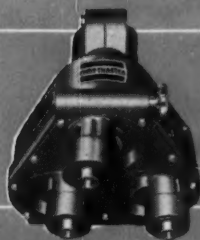
Drillheads are designed and produced by engineers whose experience in this specific field dates back to 1923. This long accumulation of engineering technique and production "know-how" is reflected in our product—a quality tool...solid, substantial and dependable!



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UNIVERSAL
ADJUSTABLE



ECCENTRIC
ADJUSTABLE



DOUBLE
ECCENTRIC
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DRILL • TAP
REAM • BORE
COUNTER • BORE
COUNTER • SINK
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makers of BALL BUSHINGS • NYLINERS • 60 Case Shifting



For more data circle 429 on Postpaid Card

more production . . .

Special Drilling Setup for Aluminum Window Frames

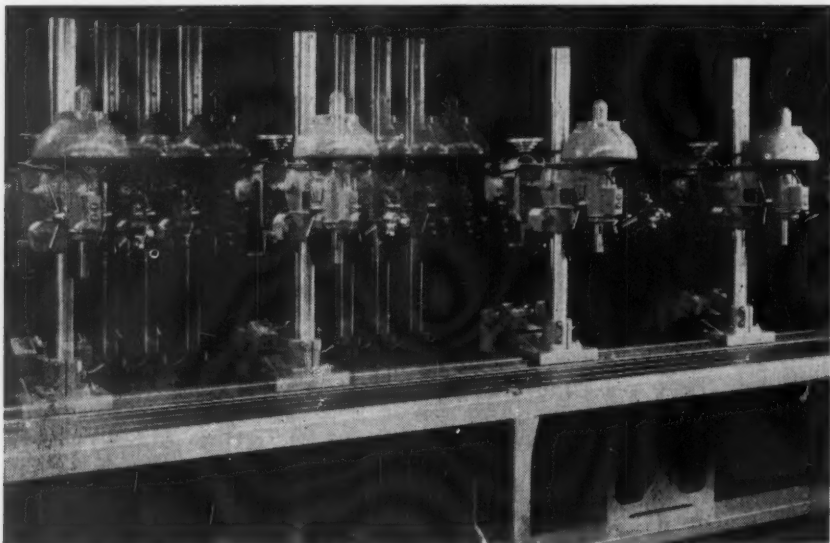
One of the country's largest manufacturers of aluminum door and window frames had a unique and difficult problem. The frames were to be fabricated from extruded aluminum channels which had to be drilled in a straight piece and then formed into a square or rectangular frame. As many as eight sets of holes—3 or 4 holes to a set—had to be drilled precisely, to line up after forming. The holes are for locating hinges, locks, cross members, and so on. Hole patterns vary with size and type of windows and doors. All holes must be drilled simultaneously without using drilling jigs.

This was the problem handed to

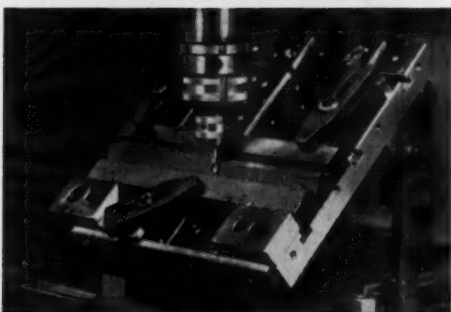
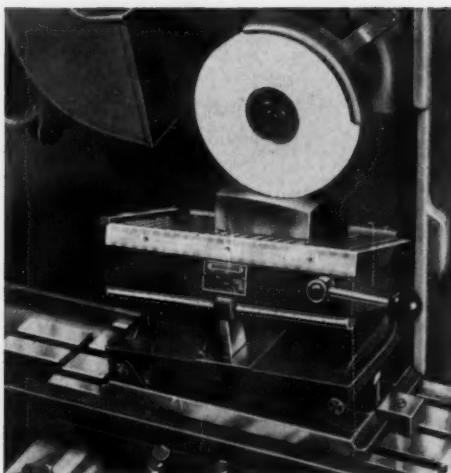
machine tool engineers of the Buffalo Forge Co., Buffalo, N. Y. The solution was a specially designed Buffalo No. 18 eight spindle drilling machine, as shown in the accompanying illustration. Each drill unit is mounted on a dovetail slide block. All eight feeds are actuated by a single mushroom head push button. Heads not used for certain setups may be cut out by toggle switches. Accurate adjustment of center distances is facilitated by a 26-foot stainless scale mounted under the dovetail block.

First job of this special Buffalo drill setup was a run of 10,000 window frames. Each was fabricated from a 26-foot extruded shape, and required five sets of four holes and three sets of three holes. All 29 holes were drilled at once at the touch of the foot switch.

For more data circle 7 on Postpaid Card



Composite view of special window frame drilling setup, illustrating movement of two heads.



Robbins Angular Tooling Saves Time...

IN GRINDING Single or compound angles set up in seconds with this Robbins Magna-Sine. Available in a range of sizes, Magna-Sines double as "everyday" magnetic chucks for all surface grinding jobs, or can be used off the machines for bench work.

IN MACHINING Heavy-duty 12" x 12" or 24" x 24" Sine Plates permit safe, accurate angular machining without V-blocks or angle plates. Non-magnetic top plate has tapped holes and T-slots. Special construction resists stress of boring and milling.

IN INSPECTION Four quick steps to easy setups: 1. Check Table of Constants for standard gage block needed for proper angle. 2. Select gage block. 3. Insert gage block and lock top plate. 4. Position work. Versatile 4" x 4" model shown here is also available as magnetic Magna-Sine.

Robbins Angular Tooling features hardened and ground alloy-steel work and bearing surfaces, distortion-free ribbed bases, positive locking, and, in Magna-Sine models, the most powerful ceramic permanent magnet ever built.

See your Robbins Representative, or write for prices and specifications of the complete line.

61-1R

EX-CELL-O FOR PRECISION

PRECISION MACHINE TOOLS • GRINDING AND BORING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND HIGH-SPEED • DRILL JO BUSHINGS • JIGS AND FIXTURE COMPONENTS • TORQUE ACTUATORS • CONSUMABLE PROJECTORS • GAGES AND GAGING EQUIPMENT • GRANITE SURFACE PLATES • COMPUTER PRODUCTS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • ATOMIC ENERGY EQUIPMENT • DAIRY AND OTHER PACKAGING EQUIPMENT

EX-CELL-O
CORPORATION

Greenville Plant, 945 E. Sater St., Greenville, Ohio

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more production . . .

Brazed Cutting Tool Cleaning Time Reduced by Shot Blasting Method

At Wesson Tool Company, Ferndale, Michigan, one small blast cleaning machine cut finishing man-hours to less than one-third, entirely

eliminated several operations and helped improve product quality. The machine is a 1½ cubic foot Rotoblast barrel manufactured by Pangborn Corporation, Hagerstown, Md.

Wesson Tool produces a wide range of standard brazed cutting tools made with Wessonmetal carbide tips. The shot blast is used for general cleaning and removal of excess flux and "easy-flo" left on the tools

as a result of the brazing operation; also to remove excess mica which adheres to the blade while parts are cooling in the mica box. Some deburring also results.

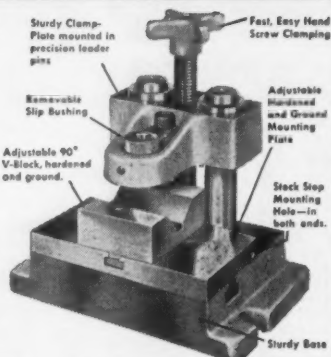
Previously, three or four persons did the finishing work by hand. This included snagging (removal of excess flux or Easy-Flo and the shims protruding beyond blade edge); boiling in water (to remove material adhering to the blade while cooling in mica); wire brushing to enable stamped numbers to be read more easily; and sanding (for locating purposes when

REPCO Time-Saving Tools

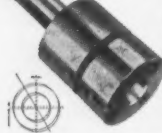
ADJUSTABLE V-BLOCK DRILL JIG

Saves Set-Up Time—
Increases Output

Here is a versatile and accurate V-Block that makes center and off-center drilling, tapping, and reaming easy and precise. Four-way V-block adjustment simplifies handling a wide range of work. Fast, easy positioning and clamping speed production. A centering locator plug and T-slots in the mounting surface plates assure fast, easy, on-center adjustment. Drill capacity #80 to ½" diameter. Handles stock from ¼" to 2" diameter.



TRUE-CENTER ADJUSTABLE TOOL HOLDER



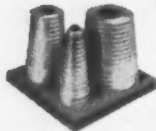
The REPCO Adjustable Holder is a precision-built tool, having two-piece construction which provides fast adjustment of the main body to compensate for as much as ¼" machine misalignment. Cuts down on tool wear, breakage, and scrap.

TWO-PIECE VISE SET



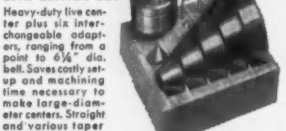
Save time with this versatile 2-Piece Machine Vise Set. Use as general-purpose vise, angle-block, or separate clamping device. Opening limited only to length of machine base. Light, accurate, rigid. Two sizes 6" and 8".

CHUCK JAW TRUING-RING SET



This Ring Set saves time, cuts cost of boring jaws. With correct diameter rings at hand, you gain hours of productive time. Plated rings range from 1" to 4" by ¼" increments. Handy peg-type rack keeps rings in place.

COMBINATION LIVE-CENTER SET



Heavy-duty live center plus six interchangeable adaptors, ranging from a point to ½" dia. ball. Saves costly set-up and machining time necessary to make large-diameter centers. Straight and various taper shanks available.

REPCO

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No distortion —
even on $\frac{1}{8}$ " stock!
MODEL "C"

KNURLMASTER Hand Knurler



For small production runs on $\frac{1}{8}$ " to 1" stock. Exclusive screw design gives perfect knurl pattern. Furnished with 3 hardened straight or diamond pattern knurls of standard $\frac{1}{2}$ " dia. Forged steel frame is self-centering. Write for illustrated folder.

ROCKWIN MANUFACTURING CO.

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DOPE!

You can count on Tamms *quality* Blue Layout Dope. Won't chip, crack, or flake. Dries fast, highly oil resistant. Get the straight dope. . . get Tamms!



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smoother, more accurate holes!*



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REAMERS
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Premium Quality High
Speed Steel, Carbide Tipped
and Solid Carbide.

Call your local distributor today—or write Ace
direct for latest catalog and price information.



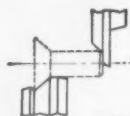
ACE DRILL
Adrian, Michigan

ORIGINATORS OF "GROUND-FROM-THE-SOLID" DRILLS
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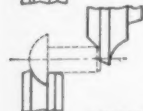
MODERN MACHINE SHOP 155

SOMMA STANDARD

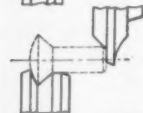
FORM & CUT-OFF TOOLS for American Standard Machine Screws



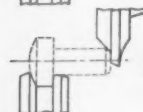
FLAT HEAD



ROUND HEAD



OVAL HEAD



OVAL FILLISTER HEAD

If you are making screws to American Standard Specifications on your B & S screw machines, you'll want to see the savings you can get on sizes #0 through $\frac{3}{8}$ " with standard form and cut-off tools from Somma.

Made from either M-2 H.S.S. or T-5 super H.S.S., these tools are scientifically heat treated and ground all over for maximum cutting life.

Write for bulletin and complete price list.

Somma TOOL CO., INC.

120 SCOTT RD., WATERBURY, CONN.

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156 MODERN MACHINE SHOP

more production . . .

they grind the blades to remove burrs left from the milling operation). With the present (Roto-blast-sanding) method, all snagging, boiling and wire brushing have been eliminated. Even the amount of sanding has been substantially reduced.

Studies conducted prior to installation of the blast cleaning machine predicted the following comparison, since confirmed: with the former method, processing a batch of 2,000 pieces took approximately 19 finishing hours plus 8 hours of cooling in mica—and 4 to 5 workmen were involved in the various operations. With the Rotoblast method, $8\frac{1}{2}$ hours are needed for finishing, plus 8



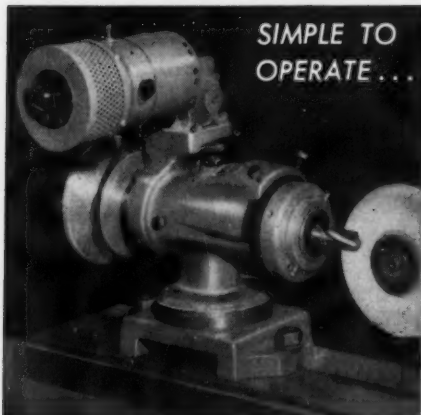
A $1\frac{1}{2}$ cubic foot Rotoblast cleans excess flux, mica and "Easy-Flo" from batch of brazed cutting tools at Wesson Tool Company.

May, 1961

GRIND YOUR OWN TOOLS . . .

**SAVE AND
IMPROVE!**

**TWIN FIXTURES TO SHARPEN
VIRTUALLY EVERY TYPE OF
TOOL IN YOUR PLANT!**



**SIMPLE TO
OPERATE...**

**NO SPECIAL OPERATOR SKILLS
REQUIRED!**

HARIG STEPTOOL RELIEF-GRINDING FIXTURE

- CAM-RELIEF GRINDER
- DRILL POINTER

Versatile, dual-purpose grinder for an endless variety of tools. Fits any tool and cutter, or surface grinder. **FAST:** step a $\frac{3}{8}$ " drill in 5 min. . . . sharpen tap in 20 sec. . . . grind **HELIXPOINT** in 3 sec.

ENORMOUS RANGE: $\frac{1}{4}$ " thru $1\frac{1}{32}$ "

HARIG AIR-FLO FIXTURE END-MILL & MILLING CUTTER SHARPENER

Spindle "floats on a cushion of air"!

. . . super sensitive, ultra precise, jerk-free, easy to use! **Speeds** and improves sharpening of end-mills and all types of milling cutters . . . small tools $\frac{1}{32}$ " up to $1\frac{1}{4}$ " shank capacity.

EASY TO USE!



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VISIT HARIG, BOOTH 1514 (A.S.T.E. SHOW)

For more data circle 436 on Postpaid Card

May, 1961

MODERN MACHINE SHOP 157

more production . . .

hours cooling—and only 3 workmen are required. The resultant savings are 10½ hours elapsed time and labor cost of approximately 50 to 70 man-hours per batch.

The new blast cleaning machine itself requires only one man. Average blast time is 6 minutes per load.

Overblasting could cause some difficulty but the barrel is equipped with an automatic cut-off to prevent this.

There are other advantages, as Wesson Tool officials point out. With blast cleaning equipment available it is used for extra jobs. For example, the shanks to which cutting tools are brazed are now blasted before brazing, to give a better bond. In addition, Wesson's line of tool holders are

also blast cleaned.

Although the Pangborn machine requires only a 3 h.p. motor on its centrifugal abrasive-throwing mechanism, it hurls well over a ton of metallic shot or grit per hour. This provides rapid cleaning of the 225-lb. work loads it handles. The machine also features highly efficient abrasive cleaning and recycling equipment to remove all coarse and fine refuse and make it possible to use and re-use the abrasive over and over again. Its steel mesh roll-up door is completely abrasive tight.

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Catalog**

128 pages packed with information and pictures—over 4,000 quality work-saving tools for the mechanic or shop.

You'll find full details on a wide range of hand tools—wrenches of all types and sizes, including special sockets for use on electric and pneumatic impact guns; a wide range of tools for production, maintenance and field service work.

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SNAP-ON TOOLS**

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NOTCHER

one stroke notching

- Hardened and ground 90° cutting angle
- 4 tons of ram pressure
- Notches up to 16 gauge sheet steel
- 6"x6" maximum notch in one operation
- Cuts clean—free from rough edges or burrs
- Power model available for high speed production

See Di-Acro Machines at ASTE Show, Booth 1404, Coliseum, New York City, May 22-26, 1961.



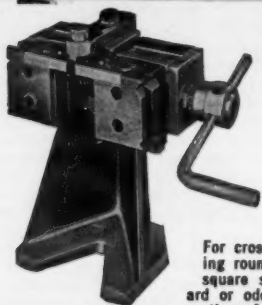
pronounced "die-ack-ro"

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formerly O'Neil-Irwin Mfg. Co.
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SPEED UP DRILLING & TAPPING JOBS!



JOHN'S DRILL JIG Self Centering

For cross or end drilling round, hexagon, or square stock or standard or odd-shaped rough castings from 1/4" to 8" O.D. Will cut tooling and production costs to minimum for 10 to 100,000 pieces. Standard removable slip fit bushings and holders available to drill center or mean off-center. The self-centering action will hold within .0015" or better regardless of jig wear or piece part O.D. variation. Jigs available in three sizes 6", 8", 14"; jaw openings 2", 3 1/4", 7 1/4".

Write for complete information

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May, 1961

for as little as
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COMPLETE
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Get This Production Boosting "TRICO-MIST" COOLANT SYSTEM Increase Production And Tool Life As Much As 500%.



For drilling, tapping, milling, sawing, grinding, etc. Removes heat from cutting edges of tools and work. Feeds can be increased considerably, finer finishes and accuracy are obtained. TRICO-MIST absorbs heat, thereby quenching it faster than flood coolants which only transfer it. Chips slide freely up the tool face and are blown away automatically. Simple needle valve controls size and volume of mist spray. Attaches to shop air line. Available with one and five gallon containers—single or multiple outlets—single or dual valve control.

SEND FOR BULLETIN 37

TRICO FUSE MFG. CO.
MILWAUKEE, WIS. U.S.A.

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MODERN MACHINE SHOP 159



Use Postpaid Cards opposite Page 32 and Inside Back Cover for requesting free copies of literature listed below.

Grinding Wheels

Macklin Co., Jackson, Mich. 32 page booklet contains grinding and sharpening information for toolmakers and toolroom foremen. Explanatory data regarding grinding wheels includes a description of wheel symbols and markings; factors governing toolroom wheel selection, types of bonds used in the manufacture of the various wheels; and wheel structure.

For more data circle 9 on Postpaid Card

Blast Cleaning Barrels

Pangborn Corp., 5600 Pangborn Boulevard, Hagerstown, Md. Bulletin No. 705 describes five heavy duty Rotoblast barrels with work capacities ranging from 15 to 102 cubic feet. Features that make Rotoblast a powerful blast cleaning process are illustrated with cut-away drawings, photos and sketches. Specifications and overall dimensions are also outlined. Illustrated case histories show how heavy duty Rotoblast barrels have reduced costs substantially at many different installations.

For more data circle 10 on Postpaid Card

Cast Alloys

Vanadium-Alloys Steel Co., General Offices, Latrobe, Pa. File folder describes cast-to-shape products. It explains the company's versatile facilities to produce castings through the use of conventional sand casting, shell molding or the ceramic (Shaw) molding process.

For more data circle 11 on Postpaid Card

Hold-Down Clamps

Adjustable Clamp Co., 436 N. Ashland Ave., Chicago 22, Ill. Catalog describes and illustrates the usefulness of "Jorgensen" Hold-Down Clamps with exclusive steel welder's shield for welding service.

For more data circle 12 on Postpaid Card

Engine Lathes

The R. K. LeBlond Machine Tool Co., Madison at Edwards Road, Cincinnati 8, Ohio. "Turn With Tape" is a new bulletin that describes LeBlond Tape Turn Lathes. These are heavy duty lathes with headstocks and carriages designed to accept commands from a General Electric Mark Century solid state numerical control system.

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Clinometers

Engis Equipment Co., 431 South Dearborn St., Chicago 5, Ill. Hilger and Watts folder describes the Microptic Precision Clinometers. This descriptive folder illustrates and gives specifications of these clinometers and accessories.

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Contour Wheel Dresser

Tracaform Corp., 11380 Kaltz, Warren, Mich. Four page, color bulletin on the Tracaform Model SMD704, which is a cost saving tool, capable of dressing complex shapes in grinding wheels to tenths accuracy.

For more data circle 15 on Postpaid Card



LITERATURE

Jig Borers

The Fostick Machine Tool Co., Cincinnati 23, Ohio. "Fosmatic Precision Boring" is a new bulletin which describes the Fosmatic Jig Borers, Models 44 and 54. These machines can be equipped with tape control in three axes, giving them full numerical depth control, as well as positioning control. Fosmatic numerical control makes them ideal for profitable use on the production line, where they combine versatility, speed and extreme accuracy.

For more data circle 16 on Postpaid Card

Air Gaging Techniques

Taft-Peirce Manufacturing Co., Woonsocket, R. I. Complete information on air gaging is available in this catalog. The book describes air gaging principles and applications, as well as the equipment available for performing these functions. A section of Catalog No. 615 is devoted to air capsules, which permit incorporation of air gaging to standard instruments such as height gages, as well as special fixtures, and another to wide tolerance gaging.

For more data circle 17 on Postpaid Card

Automatic Crown-Gear Grinder

Michigan Tool Co., Gear Grinding Div., 7171 E. McNichols Rd., Detroit 12, Mich. Technical data sheet gives complete specifications and describes operations of Model CGG-16 by 18 FA fully automatic crown-gear grinder. Details are included on the various cycles of rough, semi-finish and finish grinding; rates of feed; wheel dressing; compensation for wheel wear, etcetera. Semi-automatic and manual cycles can also be set up. This grinder can be used on spherical gear teeth, spur gears and splines.

For more data circle 18 on Postpaid Card

Drills and Surface Grinders

The Foote-Burt Co., Cleveland 8, Ohio. Compact, six page, two color condensed catalog describes the Sipp and Hammond lines of drilling machines and surface grinders. The folder highlights features of the Footburt-Hammond Radial Drilling Machine, the Footburt-Hammond Surface Grinding Machine and the Footburt-Sipp Sensitive Drills.

For more data circle 19 on Postpaid Card

Keyseater

Star Cutter Co., Post Office Box 376, 34500 Grand River Ave., Farmington, Mich. Four page, two color Catalog SC-153 describes the Star Model 25 automatic feed keyseater. Operating features, specifications and design features of the machine, which produces precision keyways up to 2½ inches wide and 22 inches long, are described and illustrated.

For more data circle 20 on Postpaid Card

Finishing Wheels

Nu-Matic Grinders, Inc., 875 East 140th St., Cleveland 10, Ohio. Literature describes a new development in the use of crowned abrasive material on Valcore inflated finishing wheels.

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Barrel Finishing Equipment

Norton Co., Worcester 6, Mass. Form 501 is a 96 page booklet including descriptions of the various barrel finishing processes, recommendations of the various abrasive shapes and sizes for applications in which they are best suited, case histories of actual uses, description of all types of finishing equipment available, discussion on compounds and their effects and a section devoted to practical suggestions on operating procedures.

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the all-in-one shipping unit — provides cushioning, moisture-resistance, insulation, and heavy duty protection. Saves labor, time and materials. Handy tear-tape opener for easy removal of contents.

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360 Florence Avenue Hillside, N. J.

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162 MODERN MACHINE SHOP

The Raymond Corp., Greene, N. Y. Sixteen page catalog describes the complete line of narrow aisle electric trucks and hydraulic hand pallet trucks. It is illustrated with on-the-job photos showing a wide variety of applications for space saving equipment. Separate pages illustrate the various models available and give pertinent information regarding specifications.

For more data circle 23 on Postpaid Card

Midland-Ross Corp., Surface Combustion Div., 2375 Dorr St., Toledo 1, Ohio. A six-page color bulletin SC-183 is fully illustrated and covers the application of vertical and horizontal equipment for processing continuous strip. Heat treatments discussed are for ferrous and also non-ferrous strip metals, and involve annealing, normalizing and galvanizing processes.

For more data circle 24 on Postpaid Card

Perkins Machine and Gear Co., West Springfield, Mass. Catalog includes specifications and standards for stock spiral bevel gears, also offers a design and buying guide. Perkins offers a full line of stock bevel gears available from factory inventory. With soft cores for custom boring, these gears are matched and lapped in pairs after hardening, thereby providing many of the qualities of custom-designed gears without the necessity of special tooling costs.

For more data circle 25 on Postpaid Card

Robert E. Platt Machine Products, Number 1 Bustleton Pike, Feasterville, Bucks Co., Pa. Flyer presents Verni-Tool which is a precision tool for measuring the length of cut on lathes and other machine tools. Also listed are features and construction details.

For more data circle 26 on Postpaid Card

Jones and Lamson Machine Co., 521 Clinton St., Springfield, Vt. Form GL6000 describes Model TC-10 optical comparator and measuring machine which is an economy sized comparator with big machine features. Six page color brochure illustrates and describes the many features of this machine in detail.

For more data circle 27 on Postpaid Card

May, 1961

CUTTING STOCK DIAMETERS UP TO 40 INCHES?

U S E

Anthony

(PATENTED)
CUTTING OFF
TOOLS

for . . .

- ★ BORING MILLS
- ★ LATHES
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THE
LEADER
FOR OVER
15 YEARS

Patented Pivoting Trunnion, Safety-Slip and Support Blade prevent blade breakage and injury to operator. Fast adjustment to lathe center.

Write for free descriptive folder A-1.

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- Few Industrial Areas Open for Distributors •
- Representatives

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SAVE - MONEY - TIME - ENERGY



LEXCO HYDRAULIC LIFT TABLES

Capacities 500# to 2,000# STD.
To 10,000# Special

Portable, adjustable height. Hand or Foot Operated. For lifting and transporting heavy castings, dies, etc., to machines and Presses.

Also DIE HANDLERS—STRIP STOCK HANDLERS

LEXCO ENGINEERING
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People work better when they SEE BETTER®



In Bell Telephone Laboratories:
Precision machinist working on a milling machine finds Magni-Focuser an invaluable seeing aid.

MAGNI-FOCUSER'S

matched prismatic lenses give needle-sharp magnification. Comfortably light weight. Fits over regular glasses. Leaves both hands free. Normal vision may be resumed by lifting head.

MAGNI-FOCUSER

SPEEDS PRODUCTION
With Third Dimensional (3-D) Vision
Leaves both hands free to work

Magni-Focuser—the binocular magnifier—reduces eye-strain and prevents squinting—thereby speeding production, increasing accuracy and minimizing the chance of errors and accidents.

Gauge reading, layout work, inspection, tool and die work are just a few of the jobs that need the Magni-Focuser. Speeds precision assemblies, blue print work. Restores the usefulness of the skilled hands of many older workers whose vision needs a seeing aid.

Magni-Focuser can help your plant produce better. Immediate delivery. 10-day trial without obligation. Return to us if not satisfied. \$10.50.

Send for descriptive folder

Edroy Products Co.

Dept. P, 480 Lexington Ave.
New York 17, N. Y.

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free literature . . .

Single Flute Countersinks

Metal Cutting Tools, Inc., Rockford, Ill. Flyer presents Metcut single flute countersinks for deburring, chamfering and countersinking. They are made of high speed steel with a special cam-relief clearance. The single flute design and specially developed cutting clearance provide high speed cutting efficiency without chatter, on either portable drill units or machine operations.

For more data circle 28 on Postpaid Card

Recessing Toolholders

Seibert & Sons, Inc., 1001 East Twentieth St., Chenoa, Ill. Flyer presents piloted holders designed to work off jig fixture or to pilot off part; easily converted from one style to the other; used on standard drill presses, radial drills, turret lathes and special machines.

For more data circle 29 on Postpaid Card

High Frequency Tools

Thor Power Tool Co., 175 North State St., Aurora, Ill. Catalog No. 62 contains 32 pages devoted to high frequency electric tools. It covers Thor's complete

line of high frequency tools including grinders, sanders, polishers, impact wrenches, screwdrivers, nut-setters, drills, reamers and balancers. Forepart of the catalog presents an analysis of high frequency tools with a capulized report on the advantages of using 180, 360 or 400 cycle tools for specific job applications.

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**HIGH PRECISION
AT LOW COST
with**

Cleveland

INDI-AC, Jr.

TRANSISTORIZED INDICATOR

OPERATES ANYWHERE

Portable — 4½ lbs. — 6" x 7" x 3½"
AC and permanent, chargeable,
battery operated.
Unaffected by shop conditions.

NO MAINTENANCE PROBLEMS

Exclusive PROTECTOR TIP*
No battery replacement
Long life transistors
No mechanical parts to wear

USE FOR ANY GAGING PURPOSE

3 scales—thousandths-tenths-millionths. Zeros
and readings coincide on all scales. Revers-
ible action gage head—Light Tip Pressure.

DIMENSIONAL-SURFACE FINISH ROUNDNESS GAGES

*Patented Applied For.

Ask for a demonstration and see why CLEVELAND Gages give you more.

Cleveland INSTRUMENT CO.

A SUBSIDIARY OF THE BENDIX CORPORATION

6220 E. Schaaf Rd. • Cleveland 31, Ohio

ELECTRONIC Gaging Equipment • Control Systems • Contract Services

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Sprockets

The Dayton Rogers Manufacturing Co., Minneapolis 7, Minn. Catalog No. 2 gives complete information on roller chain sprockets, varying in teeth from 11 to 112, in five chain sizes. These sprockets are carried in stock in Type A, Type B and Type BSK. They are made without hubs, with hubs, and complete with standard keyway and set screws. They can be provided with and without special heat treating.

For more data circle 31 on Postpaid Card



*lightweight,
accurate,
low-cost tooling*

THE DOW METAL PRODUCTS COMPANY

Division of The Dow Chemical Company



magnesium

the lightweight

- **Lightweight**—more easily handled and fabricated than any other production metal.
- **Close thickness tolerances**—new close tolerances simplify manufacture of accurate tooling of all types.
- **Machinability**—can be machined at highest speeds and feeds, taking deep cuts. Saves machining time and costs.
- **Flatness**—needs no surface machining for most tooling uses.
- **Dimensional stability**—fully annealed plate is free from residual stress.
- **Welding**—welds easily using inert gas shielded arc. Weld efficiencies as high as 95%.
- **Damping**—good damping characteristics, soaks up vibration, extends tooling life.
- **Soundness**—rolled plate is completely free from porosity.

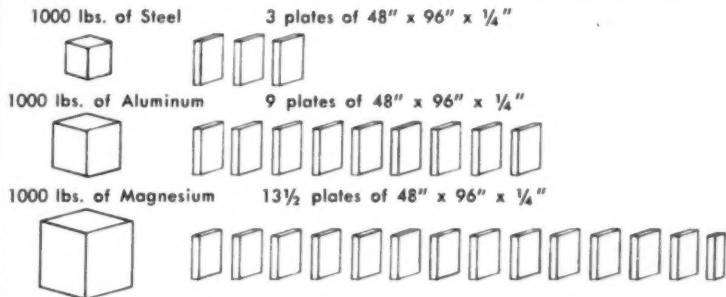
um tooling plate

metal for low-cost tooling

Save up to 40% in metal cost alone!

Magnesium tooling plate is only two-thirds the weight of aluminum, less than one-quarter the weight of steel. It can save you from 5% to 40% in metal costs alone, because of the much greater cubic footage of metal per pound . . . and per dollar. In addition, you'll realize impressive savings from the excellent machinability . . . which is more than four times that of mild steel! And still further savings when it comes to handling lightweight magnesium tooling plate. Another source of savings—no stress relief is needed after contouring or other machining operations!

FROM 1000 POUNDS OF TOOLING METAL, YOU GET THIS MANY PLATES



Light weight speeds production, cuts costs!

Gauges, jigs, templates and fixtures made from magnesium tooling plate are easy to use and handle. Often one man can move and set up magnesium tooling, while the same tooling made from steel or aluminum would require two or more men. Light weight also means greater worker safety as well as faster production.



New close thickness tolerances meet design needs

Where tooling design calls for close thickness tolerances, magnesium tooling plate delivers it. New thickness tolerances are shown, right. Maximum variation in gauge within a plate is plus or minus 0.010".

THICKNESS		TOLERANCES	
Variation in thickness, plate-to-plate			
Thickness, inches		Tolerances, ± inches	
0.250 - 0.750		0.010	
0.751 - 1.250		0.017	
1.251 - 2.000		0.025	
2.001 - 3.000		0.050	
3.001 - 3.250		0.065	
3.251 - 3.500		0.080	

... and faster machining means lower costs!

Magnesium can be machined at highest machine speeds and feeds. No other tooling metal can be drilled, tapped, bored or milled as fast as magnesium tooling plate. For example, magnesium can be milled at high feed rates, taking deep cuts, with an excellent resulting finish. This unequalled machinability of magnesium can save you from 50% to 500% in machine time.

Flatness eliminates surface machining

The as-delivered flatness of magnesium tooling plate is sufficient for most tooling uses, with no surface machining required! The reason—careful rolling and annealing techniques.



Thickness, inches	FLATNESS TOLERANCES			
	Deviation from flat ¹ —inch			
	In any 1 foot		In any 6 feet	
	Guaranteed	Typical	Guaranteed	Typical
0.250 - 1.000	0.005	0.003	0.015	0.007
1.001 - 3.500	0.010	0.005	0.020	0.010

¹Deviations from flat are measured from a straightedge placed on the surface of the plate.

High dimensional stability maintains high accuracy

Magnesium tooling plate is fully annealed, eliminating all residual stress. No stress relief is required after machining, and temperature changes will not warp magnesium tooling. This means maximum interchangeability of tooling, without need for careful temperature control in parts production. For example, parts produced in widely separated plants—using magnesium jigs and fixtures—remain interchangeable, even under varying environmental conditions.



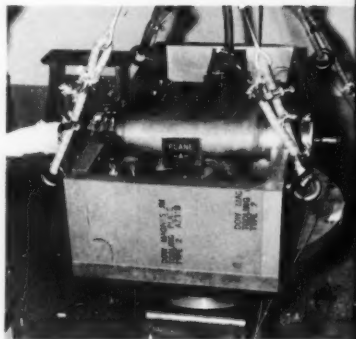
Magnesium tooling plate welds easily

Strong, rigid weldments can be made quickly using inert gas shielded arc, producing welds with up to 95% of the strength of the parent metal. While stress relief is usually needed, the required time and temperature are much less than for either steel or aluminum, providing very substantial dollar savings.



High damping capacity

Magnesium fixtures absorb vibration and damp it quickly, preventing damage and misalignment. Magnesium tooling plate is often used for vibration testing fixtures, since it does not go into resonance earlier than the parts under test; and magnesium has longer fatigue life than other light metals at high cycles and low stress.



Soundness

Because magnesium tooling plate is rolled rather than cast, it is completely free from porosity. The tough, ductile plate contains no voids.

Durability

The high strength-weight ratio of magnesium minimizes damage to tools during "in use" handling, increasing tool life. Original tolerances are unaffected even after long use. And magnesium's extreme light weight permits tool section thickness to be increased, providing great stiffness without weight penalty.

And . . .

Magnesium is non-magnetic, virtually non-sparking, and has a low coefficient of friction well suited for sliding surfaces. In addition, it is non-galling and alkali resistant.

TYPICAL MECHANICAL PROPERTIES (AZ31B alloy, all gauges)

Tensile Strength, psi	Tensile Yield Strength, psi	Elongation in 2"—%	Compressive Yield Strength, psi
35,000	19,000	10	10,000

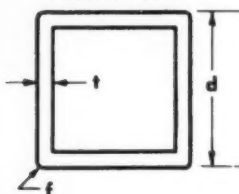
MAGNESIUM TOOLING PLATE AND SQUARE TUBE ARE AVAILABLE AS FOLLOWS:

PLATE¹

Thickness, inches	Mill Standard sizes			
0.250, 0.375	48 x 96	48 x 144	—	—
0.500, 0.625, 0.750, 1.000	48 x 96	48 x 144	60 x 144	72 x 144
1.250, 1.500, 1.750	48 x 96	48 x 144	60 x 144	72 x 144
2.000, 2.500, 3.000	48 x 96	48 x 144	60 x 144	72 x 144
3.500	48 x 96	—	—	—
4.000 and over	Special order—inquire.			

¹ Available in other sizes up to a maximum of 1800 lbs. per single piece.

SQUARE TUBE



Size—Inches			Weight lb./ft.	Area sq. in.
d	t	f		
1½	⅜	⅜	.528	.687
1⅝	⅜	⅜	.705	.918
2	⅜	⅜	1.04	1.36
3	⅜	⅜	1.62	2.11
4	⅜	⅜	2.20	2.86

In addition, many sizes of bars, rods, round tubing, equal angles, channels and I beams are available from distributor stocks throughout the country.

HERE'S WHERE TO BUY MAGNESIUM FOR YOUR TOOLING REQUIREMENTS

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Clendenin Bros., Inc.
EAstern 7-4500

Charlotte, North Carolina

Hubbell Metals Inc.
EDison 4-5385

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Fullerton Metals Co.
MErrimac 7-2700

Cleveland, Ohio

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VUlcan 3-8100

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FEderal 1-4311

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LUdlow 3-6361

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Hubbell Metals Inc.
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St. Louis, Missouri

Hubbell Metals Inc.
FRanklin 1-0212

Seattle, Washington

Eagle Metals Company
PArkway 3-9974

Spokane, Washington

Eagle Metals Company
KEystone 4-0586

*For more complete information on properties, tolerances,
sizes and fabricating techniques, write for a copy of
"Magnesium Tooling Plate Shop Manual."*

THE DOW METAL PRODUCTS COMPANY

Midland, Michigan



Plain Grinders

Landis Tool Co., Waynesboro, Pa. Bulletin 10RP-60 is a six page brochure which illustrates and describes Landis 10 inch Type R and 14 inch Type LR Plain Cylindrical Grinders. The bulletin lists the new Type R features and condensed specifications.

For more data circle 32 on Postpaid Card

Multi-Spindle Automatics

Warner & Swasey Co., Cleveland 3, Ohio. A Comprehensive Job Portfolio illustrates, complete with all technical de-

tails, efficient metal cutting jobs run on W & S Multi-Spindle Automatics. Edited especially for production men, who are alert to the need for better machining methods in the small lot field, this booklet contains a wealth of information on dozens of different workpieces and tooling applications. Each job is illustrated with dimensioned line drawings and complete setup sheet data. By comparing this information with jobs of similar shape and size in your own shop, many new ideas and methods for improving machining operations can be gained.

For more data circle 33 on Postpaid Card



ETALON INGAGE

Measures the exact BORE or blind hole size!

Reading .0001" Size: 3/16" to 4"

Takes accurate measurements of blind holes. No master — measures directly—by .0001". Automatic alignment, rectangular contact points guarantee extreme accuracy even when fully extended. Immediately detects out of round holes; with extensions measures holes up to 30" deep. Hardened contact points exert minimum pressure — will not damage fragile work.

Easy to read, deep graduations on a large diameter thimble. Dull chrome plated. Furnished in English or Metric graduations, individually or in sets.

WRITE FOR CATALOG on complete line of precision measuring instruments: VERNIER CALIPERS, MICROMETERS, DIAL INDICATORS.



ALINA CORPORATION

122 East Second St., Mineola, L. I., N. Y.

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Your Local

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**Value Added by Distribution is a
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Your Industrial Supply Distributor performs the essential marketing functions with efficiency and economy, adding immeasurable value to the tools by making them available to you when you need them.

With one local call you can get prompt delivery of many items, saving costly shut-downs. Your Distributor also saves you money on storage space . . . inventory cost . . . accounting.

Today more than ever before, when you are faced with a profit squeeze, it pays to "Telephone Your Industrial Distributor".

* **"Teamwork Tooling"** combines the talents of your Industrial Supply Distributor . . . our Stockroom Managers and Service Representatives . . . hundreds of engineering and production men in our plants . . . and even our own suppliers—all working together to help you reduce costs. You can rely on our "Tooling Team" for *highest total value!*

THE CLEVELAND TWIST DRILL CO., Cleveland 1, Ohio

BAY STATE TAP AND DIE CO., Mansfield, Mass.

Subsidiary of The Cleveland Twist Drill Co.

QUALITY



CUTTING TOOLS

• BEST SERVICE



THROUGH YOUR LOCAL DISTRIBUTOR

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For more data circle 448 on Postpaid Card

May, 1961

MODERN MACHINE SHOP 167

free literature . . .

Notchers

J. F. Kidder Mfg. Co., 446 Colchester Ave., Burlington, Vt. Catalog No. 50 introduces two machines, the Little Blacksmith Nos. 60 and 61. It includes illustrations and features of both of these machines.

For more data circle 34 on Postpaid Card

Carbide-Tipped Saws

Atkins Saw Div., Borg-Warner Corp., Greenville, Miss. Catalog No. 60-CT lists all Atkins Carbide-Tipped Circular Saws and Bank Saws regularly supplied for cutting woods, laminates and composition materials, plastics and non-ferrous metals. The catalog is fully illustrated to show different carbide-tipped tooth styles and gives usage recommendations for each type of saw.

For more data circle 35 on Postpaid Card

6 precision spindles by



Send for
Bulletin 460

You can get this rugged Avey 250 Turret-Dex with either automatic or numerical controls. Rotary, 2- or 3-axis positioning. Pre-selected speeds, feeds, rapid advance, tapping cycles. Automatic depth control all spindles; automatic turret clamp; positive spindle stop; skip index. Capacity to 1 1/4". Eight spindles optional. Avey, Box 1264, Cincinnati 1, Ohio.

For more data circle 449 on Postpaid Card



BETTER STEELS FOR BETTER PRODUCTS

NEW

FREE MACHINING

UNILOY 303MA*

STAINLESS STEEL



- MACHINES UP TO 50% FASTER
- LENGTHENS TOOL LIFE

Uniloy 303MA is a free machining grade of chromium-nickel stainless steel developed by Universal-Cyclops. It has been proven greatly superior to AISI Type 303 in key plants throughout the country.

Production tests have proved that Uniloy 303MA machines up to 50% faster than Type 303. Cutting tools last longer, decreasing tool cost and machine down time. Completed parts have a better finish than is possible with Type 303, and the corrosion resistance is far superior.

Send for a copy of our new brochure containing complete data on Uniloy 303MA, and for Performance Reports citing dollar savings achieved by satisfied customers.

Contact your nearest Universal-Cyclops steel service center or sales office. Uniloy 303MA is AVAILABLE FOR IMMEDIATE DELIVERY.

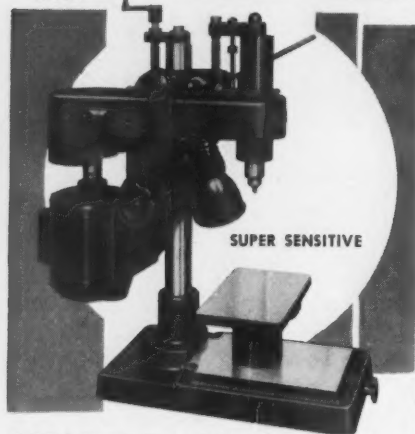
*Patent No. 2,900,250

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CYCLOPS
STEEL CORPORATION
EXECUTIVE OFFICES: BRIDGEVILLE, PA.

STAINLESS STEELS • TOOL STEELS • HIGH TEMPERATURE METALS

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NEW HAMILTON VARIMATIC® 2960b DRILLING MACHINE



CAPACITY TO 5/16"

Drills to the center of a 10" circle. Head swings radially on column and locks at any position. Vertical adjustment of head on column, 6". Spindle speeds from 840 to 9300 R.P.M. infinitely variable in two ranges. 2 1/2" feed of spindle.

NEW bearings, new castings, new ratios make this Varimatic the most accurate, the most rigid we have ever built.

CLEARANCES

Center of chuck to column	5"
Round table to chuck	10"
Rectangular table to chuck	9 1/2"
Base to chuck	14"

This new Varimatic brings a new dimension to the production drilling of small precision holes. See it at your dealer's show room.

If you would like the complete Varimatic story . . . with pictures, and a sectional engineering drawing . . . write for our FREE Bulletin No. V/2960.

THE HAMILTON TOOL COMPANY

828 SOUTH NINTH STREET
HAMILTON, OHIO

For more data circle 451 on Postpaid Card

170 MODERN MACHINE SHOP

free literature . . .

Press Brake Dies

Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 11, N. Y. Bulletin 92 presents Niagara's Tufloy line of standard, stocked press brake dies. Described and illustrated, with specifications and application data are the most widely used 90 and 30 degree air bend dies, flattening and offset dies, three and four way dies and 90 degree gooseneck punches. Illustrated examples of special punches and dies are included, along with how-to-order information.

For more data circle 36 on Postpaid Card

Waterproof Coated Abrasives

Armour Alliance Industries, Abrasives Div., 16123 Armour St., N.E., Alliance, Ohio. Two color, two page brochure describes Armour's Type M and T Rubwet (waterproof) coated abrasives. Both types employ an anti-skid coat on the back of the waterproof paper to prevent them from slipping in the operator's hands during wet sanding.

For more data circle 37 on Postpaid Card

Oilless Bearings

Arguto Oilless Bearing Co., 149 Berkley St., Philadelphia 44, Pa. Catalog 511 on Arguto-MP Oilless Bearings lists the complete line of standard size cylindrical and standard flange bearings made in Arguto-MP materials. These standard Arbuto-MP bearings include all ASTM specifications. Tables of dimensional tolerances are also included.

For more data circle 38 on Postpaid Card

Milling Spindles

Colonial Broach & Machine Co., Contour Milling Div., 21601 Hoover Road, Warren, Mich. Bulletin (CMS-61) includes operating data and specifications on their full line of constant-horsepower infinitely-variable-speed standard milling spindles. Also included are dimensions of importance in adapting these spindles on existing machine tools.

For more data circle 39 on Postpaid Card

Design Suggestions

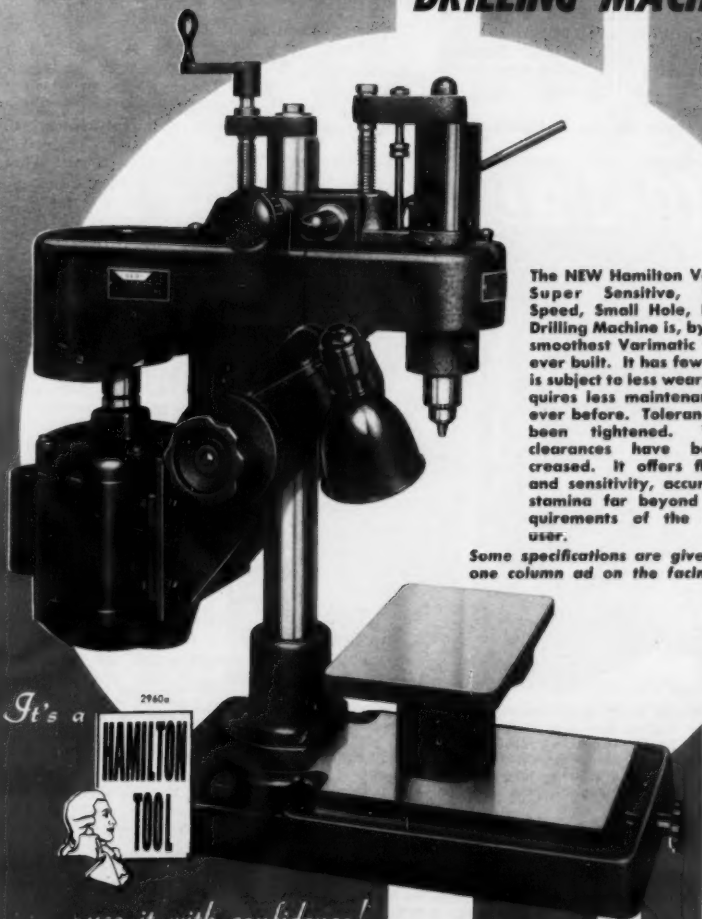
The Lincoln Electric Co., Dept. 2411, Cleveland 17, Ohio. Study contains certain design suggestions for solving problems on designing machine tool tables, vacuum chucks and loading ramps in welded steel.

For more data circle 40 on Postpaid Card

May, 1961

NEW

HAMILTON VARIMATIC® SUPER SENSITIVE DRILLING MACHINE



The NEW Hamilton Varimatic, Super Sensitive, Variable Speed, Small Hole, Precision Drilling Machine is, by far, the smoothest Varimatic we have ever built. It has fewer parts, is subject to less wear, and requires less maintenance than ever before. Tolerances have been tightened. Working clearances have been increased. It offers flexibility and sensitivity, accuracy and stamina far beyond the requirements of the average user.

Some specifications are given in the one column ad on the facing page.

It's a

2960a



use it with confidence!

THE HAMILTON TOOL COMPANY

828 SOUTH NINTH STREET

HAMILTON, OHIO

For more data circle 451 on Postpaid Card

May, 1961

MODERN MACHINE SHOP 171

free literature . . .

Lathe Tools

Capitol Tool & Carbide Corp., 1403 Utica Ave., Brooklyn 3, N. Y. Price list on single pointed carbide tipped lathe tools lists all standard tools. Most sizes are available for immediate shipment in grades of 883 and 78B. Other grades could be furnished. It also contains a comparison chart of various carbide grades.

For more data circle 41 on Postpaid Card

Grinding Wheels

Simonds Abrasive Co. Div., Simonds Saw and Steel Co., Philadelphia 37, Pa. Bulletin ESA-141 describes General Purpose grinding wheels and bulletin ESA-191 explains plain cylindrical grinding wheels.

For more data circle 42 on Postpaid Card

Tapping Machine

Kaufman Mfg. Co., 551 S. 29th St., Manitowoc, Wis. New literature features the Model 10E-20 tapping machine. In addition to fully describing the equipment, with complete specifications on

the 10E-20, the folder gives pictorial examples of work done on various Kaufman machines, with data and descriptions of Models 10E-126 and 10E-1125. The folder also tells of Kaufman's specialized engineering service available for any firm interested in standard or custom-built machines.

For more data circle 43 on Postpaid Card

Hold it, Mr. Distributor!



... I've got a metal cutting problem. That's all you've got to say ... and your nearby Victor Saw distributor gets busy finding the answer. He's well posted on advances in metal cutting, and all Victor's engineering facilities and personnel are at his beck and call. He carries the full Victor line of hand and power hack saw blades, band saw blades, hole saws and files. He knows which is best for your particular job and can deliver it quickly.

Get the habit of calling him in! You can count on him for sound advice ... and on the solid quality of the Victor products he sells.

METAL CUTTING PRODUCTS



Free Metal Cutting Guidebook and Wall Chart tell about the different kinds of blades and how to use them. Just ask your Victor distributor, or write to Victor direct.

VICTOR
VICTOR SAW WORKS, INC.
Middletown, N.Y.

For more data circle 44 on Postpaid Card

Bending Press

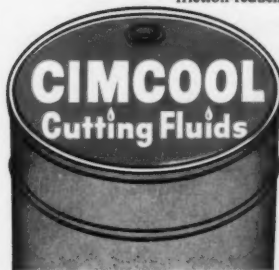
Pines Engineering Co., Inc., 646 Walnut St., Aurora, Ill. Bulletin No. 379 provides 12 pages of illustrations, design features and description of the Pines complete line of Bending Presses that are especially designed for faster, more efficient bending of a variety of parts made of tubing, pipe, rod, bar and certain shaped stock. Numerous examples of typical applications complete with part description and production figures are included.

For more data circle 44 on Postpaid Card

Announcing A Major "Break-Through" In Cutting Fluid Performance FIVE-STAR ★ ★ ★ ★ ★ CIMCOOL

**From the Research Laboratories
and Production Proving Grounds
of Cincinnati Milling Comes This
Remarkable New Product With
These Proven Advantages:**

- ★ **TROUBLE-FREE.** At lean, low-cost dilutions, Five-Star CIMCOOL goes into your machines and *stays put with no problems!* It lasts a long time and is extremely dependable.
- ★ **NO ODORS.** New bactericides keep Five-Star CIMCOOL in operation *four to six times* as long as other fluids.
- ★ **EXCEPTIONAL RUST PROTECTION.** Two different types of rust inhibitor in this *single-mix* concentrate provide up to 300% more rust control. This rust-control ability permits leaner dilutions, saves you money.
- ★ **CLEAN AND SAFE.** Five-Star CIMCOOL is just as clean as fresh, clear water to work in. It feels, smells and looks good. It will not smoke or catch fire. Good reasons why operators like it.
- ★ **LENGTHENS TOOL LIFE.** Production tests prove this new concentrate is second to none in providing *non-stop production*, because of its exclusive CIMCOOL EP, friction-reducing chemicals.



FOR 100% OF ALL METAL CUTTING JOBS
Production-Proved products of The Cincinnati Milling Machine Co.

FIVE-STAR CIMCOOL—Newest in the industry-proven line of Cimcool® Cutting Fluids.
CIMPERIAL® — Heavy duty replacement for cutting oils in those low-speed tough jobs.
CIMPLUS — The transparent grinding fluid which provides exceptional rust control.
CIMCUT Concentrates (AA, NC, SS) — For every job requiring an oil-base cutting fluid.
ALSO—CIMCOOL Tapping Compound—CIMCOOL Bactericide—CIMCOOL Machine Cleaner.

For full information on the complete family of Cimcool Cutting Fluids, call your CIMCOOL Distributor. Or contact Cincinnati Milling Products Division, Cincinnati 9, Ohio.

*Trade Marks Reg. U.S. Pat. Off.

For more data circle 453 on Postpaid Card

May, 1961

MODERN MACHINE SHOP 173

free literature . . .

Gages

Boice Gages, Inc., Hyde Park, N. Y. A 64 page catalog lists replacement parts and spares for high precision, dial indicator gages and setmasters. Contents of the book are classified by categories. For more data circle 45 on Postpaid Card

Ovens

Blue-M-Electric Co., 138th & Chatham St., Blue Island, Ill. A 12-page, three-color bulletin No. 1960 features Blue M

Power-O-Matic 60 Mechanical Convection Ovens with Blue M Saturable Power Reactor Control. It illustrates and describes laboratory production ovens, aging ovens, miniature batch ovens, hazard-safe ovens, five-drawer ovens, testonic environmental cabinets, incubators, sterilizers, gravity ovens, conditioning cabinets, and refrigerated baths. For more data circle 46 on Postpaid Card

Machine Mountings

Barry Wright Corp., Barry Controls Div., 700 Pleasant St., Watertown 72, Mass. Flyer in color presents Barry Cup-

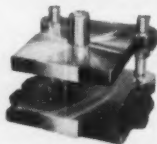
mounts, Series 1,000. These shock and vibration isolators have been designed for loads up to 100 pounds per isolator. They reduce noise, shipping damage and equipment failure. For more data circle 47 on Postpaid Card



Nobody, but nobody, tends your die set needs with such dispatch as Danly. Whether you want a new Precision Pilot Guide Post for extra ease in die set assembly . . . or a fast order placed for a special die set, you can depend on your nearby Danly man for quick, effective action. Like all 23 Danly branches and distributor assembly plants, he stocks a wide selection of die sets and diemakers' supplies for immediate delivery. Next time you need die set service, call your Danly man. He's as close as your phone — and at your service 'round the clock.



NEW INSULATED Demountable Bushings, designed for use in machining mounted dies by electrical discharge, are fully described in new, fact-filled bulletin. Write for your copy.



PRECISION PRESSES, DIE SETS AND DIEMAKERS' SUPPLIES

DANLY

DANLY MACHINE SPECIALTIES, INC.
2100 South Laramie Ave., Chicago 50, Illinois

For more data circle 454 on Postpaid Card

Grinding Vise

Toolroom Equipment Div., The Producto Machine Co., 900 Housatonic Ave., Bridgeport 1, Conn. A new data sheet describes the company's new precision grinding vise, which is specially designed to allow for grinding squares in two planes without removing part from the vise.

For more data circle 48 on Postpaid Card

Cylinders

Sheffer Corp., Cincinnati, Ohio. Six page color brochure presents the CLH Series of air and hydraulic cylinders in universal, clevis, pivot and stud mount styles.

For more data circle 49 on Postpaid Card

Die Heads

Eastern Machine Screw Corp., 65 Barclay St., New Haven 6, Conn. Bulletin No. 12D contains details about H & G Stationary Die Heads, styles DMS self-opening and DMSL with alignment feature and H & G Throw Away Insert Chasers. These stationary die heads are designed for use on turret lathes, hand screw machines and various other applications where the die head does not rotate.

For more data circle 50
on Reader Service Card

Alloys

Ampco Metal, Inc., Box 2004, Milwaukee 1, Wis. Bulletin G-51a, a four page, two color bulletin includes physical properties, recommended applications and current stock sizes of extruded solid rounds, centrifugally-cast bars, extruded rectangles, rolled sheet and plate, die blanks and a variety of guide pin bushings.

For more data circle 51
on Reader Service Card

Diamond Setting Powders

Wall Colmonoy Corp., 19345 John R. St., Detroit 3, Mich. No. 58 two color engineering data sheet describes Colmonoy Diamond Setting Powders. The new literature discusses the three grades of "compression molding" powder available and outlines their respective recommended applications. Also covered are such subjects as sintering temperature, Rockwell hardnesses, ductility and storage recommendations for these diamond setting powders.

For more data circle 52
on Reader Service Card

STANDARD'S Center-Cutting END MILLS ...

Built TOUGH ENOUGH for tough metals...

... whether it's plunge or traverse cutting ... profiling ... cavity milling ... die sinking or conventional slot milling, STANDARD'S END MILLS perform longer, more efficiently, with a finer work finish on difficult machining operations.

... Call the STANDARD Distributor in your area, he will show you a variety of TWO-, FOUR- and SIX-FLUTE, Double or Single End Mills ...

MORE metal • Standardize
removed at • with STANDARD
LESS COST • Quality!



DEPEND upon STANDARD'S Authorized Distributors ...

For Twist Drills, Reamers, Taps, Countersinks, End Mills, Milling Cutters, Hobs, Gages, Dies, Carbides (solid or tipped) ... and for Engineering or Technical Information.



STANDARD TOOL Co.

3950 CHESTER AVENUE

CLEVELAND 14, OHIO

BRANCH WAREHOUSES IN NEW YORK • DETROIT • CHICAGO • DALLAS • LOS ANGELES • SAN FRANCISCO

For more data circle 455 on Postpaid Card

EXTRA TOUGH • MAKE BIG JOBS EASY



WILLIAMS HEAVY SERVICE SUPERRENCHES®

For big nut turning jobs requiring man-sized, two-fisted action,—reach for Williams Big Alloy Wrenches. Your Williams Distributor has a complete selection of Structural, Construction, Box and Striking face styles. All drop-forged from selected alloy steel and heat-treated for added toughness. Openings up to 3½" have extra built-in strength, yet are designed to overcome clearance problems. Handles provide plenty of extra leverage.

**AVAILABLE IN CHROME—AND/OR
INDUSTRIAL GRAY FINISHES**

J. H. WILLIAMS & CO.

DIVISION OF UNITED GREENFIELD CORPORATION
412 VULCAN ST., BUFFALO 7, N. Y.



For more data circle 456 on Postpaid Card

STRENGTH • DESIGN • ECONOMY



WILLIAMS INDUSTRIAL BLACK WRENCHES

Here is the same high quality design and manufacture as the famous Williams' Alloy Wrenches with the following industrial features. New, rust-resistant black oxide finish, chemically applied, lowers cost . . . will not chip or wear off. High lustre head and face polishing are omitted to lower average cost.

These economy features are important where wrench replacement rate is high. Made from strong, tough steel, carefully heat-treated. See your Williams Distributor.

**33 PATTERNS—354 STYLES
OPENINGS FROM 3/16" TO 7-5/8"**

J. H. WILLIAMS & CO.

DIVISION OF UNITED GREENFIELD CORPORATION
412 VULCAN ST., BUFFALO 7, N. Y.



For more data circle 457 on Postpaid Card

176 MODERN MACHINE SHOP

free literature . . .

Abrasive Belt Machines

Carborundum Co., Curtis Machine Div., P. O. Box 337, Niagara Falls, N. Y. This brochure sets forth the specifications and advantages of Curtis 150 series of abrasive belt machines for woodworking and metalworking industries. Handles work pieces 1/20 to 3 inch thick to 49 inches wide.

For more data circle 53 on Postpaid Card

Milling Cutter

Futurmill, Inc., 6380 Highland Rd., Pontiac, Mich. A 28 page catalog presents the complete line of Futurmill Indexable Blade Milling Cutters. The catalog also contains technical data concerning milling feeds and speeds; trouble shooting procedure and check-off list; and factors that determine the degrees of finish.

For more data circle 54 on Postpaid Card

Marking Devices

George T. Schmidt, Inc., 1806 W. Belle Plaine, Chicago 13, Ill. Complete catalog on the GTS line of marking tools.

For more data circle 55 on Postpaid Card

HEAT-TREATED PROOF-TESTED



WILLIAMS DROP-FORGED EYE BOLTS

Want service "beyond the call of duty"? Williams Eye Bolts are drop-forged from carbon steel; no welds, specially heat-treated after forging to further increase strength and toughness. Proof-tested to Military Standards to 50% beyond safe working loads. Plain and shoulder patterns . . . blank or threaded—they're all dependably yours from your Williams Industrial Distributor.

**CAPACITIES UP TO 16 TONS
LENGTHS UP TO 18 INCHES**

J. H. WILLIAMS & CO.

DIVISION OF UNITED GREENFIELD CORPORATION
412 VULCAN ST., BUFFALO 7, N. Y.



For more data circle 458 on Postpaid Card

May, 1961

Cutting Tools and Accessories

Greenleaf Corp., 512 Franklin Ave., Pittsburgh 21, Pa. Catalog 161, 16 pages on mechanical metal cutting tools and accessories describes the company's complete line of toolholders, milling cutters, locking wedges and special tooling.

For more data circle 56 on Postpaid Card

Self-Locking Cap Screws

Klincher Kapscrew, Inc., Dept. KKL-294, 2153 Hillside Ave., Indianapolis 18, Ind. Four page color brochure describes the Klincher Self-Locking Kapscrew, its design and principle of locking. It employs the same locking principle as the Klincher Locknut, namely by deflection of the locking collar which clinches both radially and axially.

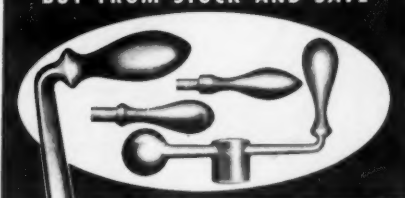
For more data circle 57 on Postpaid Card

Hydraulic Press Brakes

National Automatic Tool Co., Richmond, Ind. Bulletin No. 400 describes and illustrates Natco Hydraulic Press Brakes available in five models, of 200 to 500-ton capacity, covering a wide range of fabricating operations.

For more data circle 58 on Postpaid Card

BUY FROM STOCK AND SAVE



WILLIAMS DROP-FORGED HANDLES

Why use "specials" when Stock Handles from your Williams Industrial Distributor can do the same job and save you money? Eleven Crank Handles from 1 1/4" to 10" (C. hub to C. handle). Eight Balance Handles from 1 1/4" to 3 7/8" (C. hub to C. handle). Nine Ball Pattern Machine Handles from 2" to 6 1/2" long. Four Cone Pattern Machine Handles from 3 1/2" to 6". Crank and balance handles heat-treated.

4 STYLES, 62 STOCK ITEMS
HANDLE MOST REQUIREMENTS

J. H. WILLIAMS & CO.

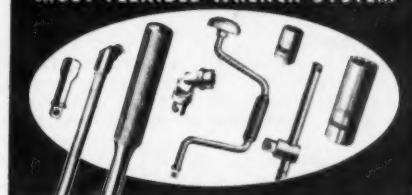
DIVISION OF UNITED GREENLEAF CORPORATION
412 VULCAN ST., BUFFALO 7, N. Y.



For more data circle 460 on Postpaid Card

May, 1961

MOST FLEXIBLE WRENCH SYSTEM



WILLIAMS DETACHABLE SUPERSOCKETS®

Save valuable time with these versatile SUPERSOCKETS®. Regular, deep and universal sockets come in hex, 12 pt., square and 8 pt. styles from 3/16" to 3-1/4". Metric openings from 10 to 36 mm. Five square drive sizes: 1/4", 3/8", 1/2", 3/4" and 1" ... plus ratchets, extensions, and special attachments to form hundreds of wrench combinations.

Made from selected alloy steel, heat-treated and chrome-plated. Order from your Williams Industrial Distributor.

88 DRIVERS & ATTACHMENTS
235 SOCKETS—5 DRIVE SIZES

J. H. WILLIAMS & CO.

DIVISION OF UNITED GREENLEAF CORPORATION
412 VULCAN ST., BUFFALO 7, N. Y.



For more data circle 459 on Postpaid Card

HOLD DOWN YOUR MACHINING COSTS



WILLIAMS FORGED SET-UP TOOLS

Choose from a complete line of T-Slot bolts and nuts, wedges, washers, strap clamps and lathe dogs. Sizes and styles to cover most planer, lathe, drill press, milling and boring machine requirements far more efficiently than any make-shift holding devices. Made from a strong, tough grade of carefully selected steel ... heat-treated to increase strength and toughness. Ask your Williams Distributor to demonstrate their specific features and many applications.

OVER 180 ITEMS
FOR FASTER SET-UPS

J. H. WILLIAMS & CO.

DIVISION OF UNITED GREENLEAF CORPORATION
412 VULCAN ST., BUFFALO 7, N. Y.



For more data circle 461 on Postpaid Card

MODERN MACHINE SHOP 177

free literature...

Air Cylinders

Mo-Bar Hydraulics Co., Crystal Lake, Ill. Bulletin No. 202, twelve pages in color introduces Mo-Bar Air Cylinders. For more data circle 59 on Postpaid Card

Fabricator

Wales Stripit, Inc., 207 Buell Rd., Akron, N. Y. Flyer presents Stripit Super 30 Fabricator with a 30 inch throat depth. For more data circle 60 on Postpaid Card

L-O-X Valve

Ross Operating Valve Co., 105 East Golden Gate Ave., Detroit 3, Mich. Flyer in color presents Ross L-O-X Valve. It is so designed that when closed, supply-air to the machine is shut off and air downstream is exhausted. The valve can be padlocked in this position if the user so desires.

For more data circle 61 on Postpaid Card

Automatic Dust Collectors

Torit Manufacturing Co., 1133 Rankin St., Dept. 735, St. Paul 18, Minn. The

special capabilities of the Torit Automatic Dust Collector in unlimited applications are outlined in this two-color folder. The 11 models made possible by the automatic's modular design, their dimensions and filter areas are detailed in an easy-to-read table. A schematic drawing and legend explain the collector's operation and photographs depict such components as the unique self-cleaning mechanism with which each collector is equipped.

For more data circle 62 on Postpaid Card



**RIGHT
NOW...**

**You
Need**

SENTRY ECONOMY

To offset rising costs and meet price competition you must save money by increasing production efficiency. In your tool room, a Sentry high speed steel hardening furnace with the truly neutral Diamond Block atmosphere means immediate savings.

- low initial cost
- quick heating
- simple operation
- no tool spoilage
- no scale no decarb
- no finish grinding
- consistent quality

For demonstration, bring tools to Booth 1724, ASTME Tool Show.

Sentry TRADEMARK **ELECTRIC FURNACES**

Request Catalog 2-H • Write **THE SENTRY CO., FOXBORO, MASS.**

For more data circle 462 on Postpaid Card

Surface Equipment

Challenge Machinery Co., Grand Haven, Michigan. 12 page catalog No. 840 has descriptive specifications on over 400 different types and sizes of precision surface equipment. Also included in the catalog is information on granite surface plate equipment and information for use by tool designers on semi-steel angle plates.

For more data circle 63 on Postpaid Card

BEST TIP



OF ALL!



Ask your distributor for

Chicago-Latrobe DRILLS

CHICAGO-LATROBE PRODUCES A COMPLETE LINE OF DRILLS, REAMERS, END MILLS, COUNTERSINKS, COUNTERBORES, CARBIDE TIPPED TOOLS, GUN DRILLS, AND THE EXCLUSIVE C-L "LO-TORK" CHIP BREAKER DRILLS. FOR EXPERT ADVICE AND FINEST SERVICE CALL YOUR CHICAGO-LATROBE DISTRIBUTOR.

CHICAGO-LATROBE

419 WEST ONTARIO STREET • CHICAGO 10, ILLINOIS

Clip and File

DRILLING TIPS YOU CAN USE

Select the Correct Helix

The spiral flutes of a twist drill perform three functions. They bring the chips out of the hole; provides the proper rake angle at the cutting lip; permit coolant to reach the point of the drill. These actions are vital. All are affected by the helix (the angle of spiral) of the flutes. Be certain that the helix you choose is the correct one for the material being drilled.

Regular Helix



This is the familiar style and the best helix for most general purpose shop work in steel, forgings, castings, and other ferrous materials. Where extra rigidity is required—as in portable drilling—select a regular helix drill with heavy duty construction.

Fast Helix



In general the fast helix is selected for drilling materials of low tensile strength like aluminum, magnesium, copper, and thermoplastics. These materials produce a large volume of chips and the low angle of incline of the flutes is specially suitable for their removal. Where chip removal is slowing drilling, the fast helix may solve the problem.

Slow Helix



This drill is generally used for materials that break up into very small or powdery chips... as occurs in drilling brass; hard rubber; thermo-setting plastics such as bakelite; fibre and plastic laminates. These drills are of light construction with wide flutes and are not usually suitable for heavy duty work.



USE
CHICAGO-LATROBE
CATALOG NUMBER
60

for the most complete listings of drills of all types—plus valuable advice on their use. INCLUDES PRICES.

For more data circle 463 on Postpaid Card

free literature...

Punches, Dies and Rivets

George F. Marchant Co., 1420 South Rockwell St., Chicago 8, Ill. Catalog 60 describes and illustrates "New Process" punches, dies, rivet sets and compression riveter dies of every size and shape. For more data circle 64 on Postpaid Card

Liquid Lifter Pump

Huber Industries, Inc., 4950 Hillside Ave., Cincinnati 33, Ohio. Flyer in color presents Huber's Liquid Lifter Pump. For more data circle 65 on Postpaid Card

Clamp Assemblies

Accurate Bushing Co., 440 North Ave., Garwood, N. J. A 12 page, Catalog No. JF-61 contains complete information and drawings of the more than 1,000 clamp assembly and fixture component items that are available from factory stock. Also included is a separate price list, JFP-61.

For more data circle 66 on Postpaid Card

Drilling Tools

The Dumore Co., 1302 Seventeenth St., Racine, Wis. Bulletin D-60-C contains brief descriptive details, ordering information and data on how to use Dumore Portable Precision Drilling Tools for unlimited machining versatility for holes ranging in size from 0.001 to $\frac{3}{8}$ inch.

For more data circle 67 on Postpaid Card

Gage Handle

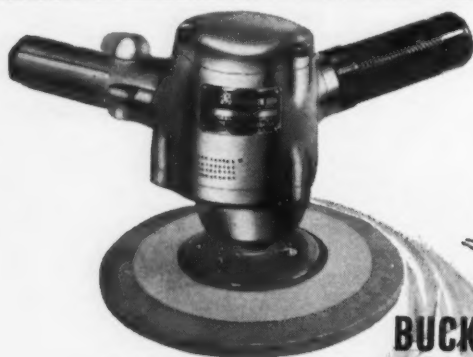
C. E. Foster Gage Corp., 5341 English Ave., Indianapolis 19, Ind. Four-page catalog describes and illustrates the Foster Model 61-H D Gage Handle for the precision production line gaging of tapped holes. The operation of the unit is fully explained in this catalog.

For more data circle 68 on Postpaid Card

Fasteners

Standard Pressed Steel Co., Box 556, Jenkintown, Pa. A ten page reference listing provides rapid identification of more than 160 standard aerospace fasteners, by configuration, specification name and generic name. Other helpful data is provided in the literature.

For more data circle 69 on Postpaid Card



BUCKEYE

58S SERIES AIR SANDER

**...REMOVES 50% MORE METAL
THAN ANY SANDER IN ITS CLASS!**

Now you can increase sanding production without increasing tool cost. Buckeye 58S series Vertical Sanders have higher horsepower, higher torque and lighter weight (one hand operation) than any other sanders in their price class. They are available in governed and non-governed models ... with speeds ranging from 1500 to 8500 RPM ... with safety lever or thumb flip throttle ... 5", 7" and 9" sanding pads ... all models are muffled and have adjustable dead handle as standard equipment.

Remember Buckeye produces the most complete line of abrasive tools in the industry.

Buckeye Tools
CORPORATION

P.O. BOX 966, DAYTON 1, OHIO
Pioneering Power Tools for Industry Since 1920



For more data circle 464 on Postpaid Card

Short Run Stampings

Federal Tool and Manufacturing Co., 3615 Alabama Ave., Minneapolis 10, Minn. Brochure No. 15 tells the story of short run stampings featuring the facilities, personnel and experience that assure speed, quality, low cost and controlled tolerances.

For more data circle 70 on Postpaid Card

Radial Drill

Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. Catalog No. BR-11, a four page illustrated bulletin, describes Bickford 11 inch radial drilling machine. Included are detailed descriptions of standard machine features. Dimensions and specifications are listed, as is data on optional spindle speeds, power feeds and tap leads.

For more data circle 71 on Postpaid Card

Industrial Light

Danly Machine Specialties, Inc., 2100 South Laramie Ave., Chicago 50, Ill. Bulletin No. IL-1 tells how the Danly Industrial Light, Model 415, Type DLA 6, is designed to withstand the inherent shock and vibration conditions which are normally associated with machine tool operations and punch press operations.

For more data circle 72 on Postpaid Card

Steel Bars

LaSalle Steel Co., 1420 150th Street, Hammond, Ind. A study on "Fatigue-Proof" Steel Bars especially compiled for production, design and plant maintenance engineers, as well as various other individuals.

For more data circle 73 on Postpaid Card

Flexible Shaft Units

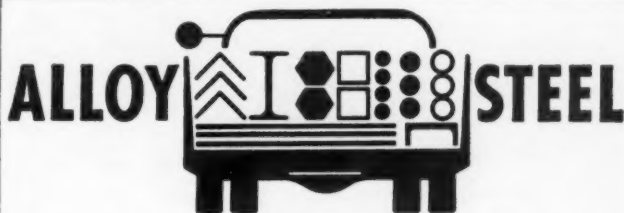
R. G. Haskins Co., 265p West Harrison St., Chicago 12, Ill. Brochure in color presents Haskins Flexible Shaft Units in direct drive or countershaft; pedestal, truck mounted or suspended type. Also includes specifications and accessories.

For more data circle 74 on Postpaid Card

Brazer, Converter and Scraper

Nelson & Jacobson, Inc., 3546-48 North Clark St., Chicago 13, Ill. Booklet illustrates and describes the Flexcut Flue Scraper, Electro Band Saw Brazer and the Plani-Drive Converter.

For more data circle 75 on Postpaid Card



*There's a W-L warehouse near you to meet
your every requirement promptly*

Wheelock, Lovejoy maintains seven strategically-located warehouses. All of them are completely staffed and completely stocked, to fill your alloy steel needs promptly. Standard AISI and SAE steels, and our own famous HY-TEN steels offering advanced metallurgical features at competitive prices, can be had in bars, billets and forgings, in specified sizes, shapes and treatments.

Write today for *free* Wheelock, Lovejoy Data Sheets, containing complete information on grades, applications, physical properties, tests, heat treating, etc.

WHEELLOCK, LOVEJOY

& COMPANY, INC.

"The Alloy Steel Center"

140 Sidney Street, Cambridge 39, Mass.

For more data circle 465 on Postpaid Card



free literature . . .

Profile Grinders

Rice Pump & Machine Co., 226 Park Ave., Belgium, Wis. Bulletin PG 1-38, in color, presents new PG Series profile grinders. This illustrated brochure also gives features and specifications on several models.

For more data circle 76 on Postpaid Card

Air Gaging

Standard Gage Co., Poughkeepsie, N. Y. Catalog No. 61 announces the release of its Air Gage Engineering and Purchasing Guide. This 32 page illustrated catalog is designed as a tool to help in proper gage selection. It is also a source of basic design data for the gage engineer and complete ordering information for purchasing personnel.

For more data circle 77 on Postpaid Card

Chuck and Collet Actuators

PowerGrip, Inc., Rockfall, Conn. Catalog No. 30261 describes chuck and collet actuators as non-rotating air cylinders with a large center hole, and used to operate air and collet chucks. Information on specifications, dimensions, uses and applications is also presented.

For more data circle 78 on Postpaid Card

Drills

Ace Drill Corp., Adrian, Mich. Informative 12 page booklet describes and illustrates the "Ground-from-the-Solid" process of producing drills from uniformly heat treated mill length bars of hardened high speed steel. Also featured are brief descriptions of Ace Longboy, Stub, "Hi-Brinell" carbide and taper length drills; drill length and chucking reamers; and hardened high speed steel drill and reamer blanks.

For more data circle 79 on Postpaid Card

Turret Lathe

Gisholt Machine Co., Madison 10, Wis. Literature is available on Masterline AR (Automatic Ram) Turret Lathe which has automatic cycle efficiency plus the versatility and quick setup of the hand operated ram type turret lathe on both bar and chucking work. Diagram of tool layout and specifications are also included.

For more data circle 80 on Postpaid Card

Relief-Grinding Fixture

Harig Mfg. Corp., 5765 West Howard St., Chicago 48, Ill. Literature describing the Harig Steptool Relief-Grinding Fixture is available in a four page color brochure showing how to use this fixture to grind any type of drill, and to do cam-relief grinding on an endless variety of tools. Also described are the infinite cam adjustments, how to locate tools in the fixture, grinding flutes, Helixpoints, set-ups for sharpening taps and piloted countersinks, etcetera.

For more data circle 81 on Postpaid Card

Pull-Down Machine Vise

International Machine & Tool Corp., Warwick Industrial Park, Providence, R. I. Catalog No. 1722 presents a pull-down precision machine vise for surface grinders, universal tool grinders, tool shapers, jig grinding machines or for any other clamping job requiring high-grade accuracy. Specifications are also listed.

For more data circle 82 on Postpaid Card

Speed Indexer

Erickson Tool Co., 34354 Solon Rd., Solon, Ohio. Catalog L, Section F is a two color, four page bulletin which describes the Erickson Speed Indexer. It presents detailed specifications and engineering data on Models 400, 450 and 600.

For more data circle 83 on Postpaid Card

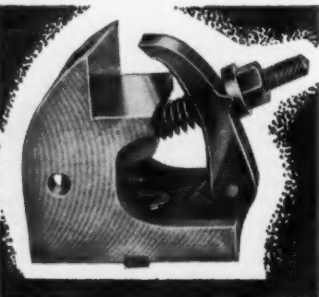
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Original HART Milling Fixtures

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Value proved by years of use.
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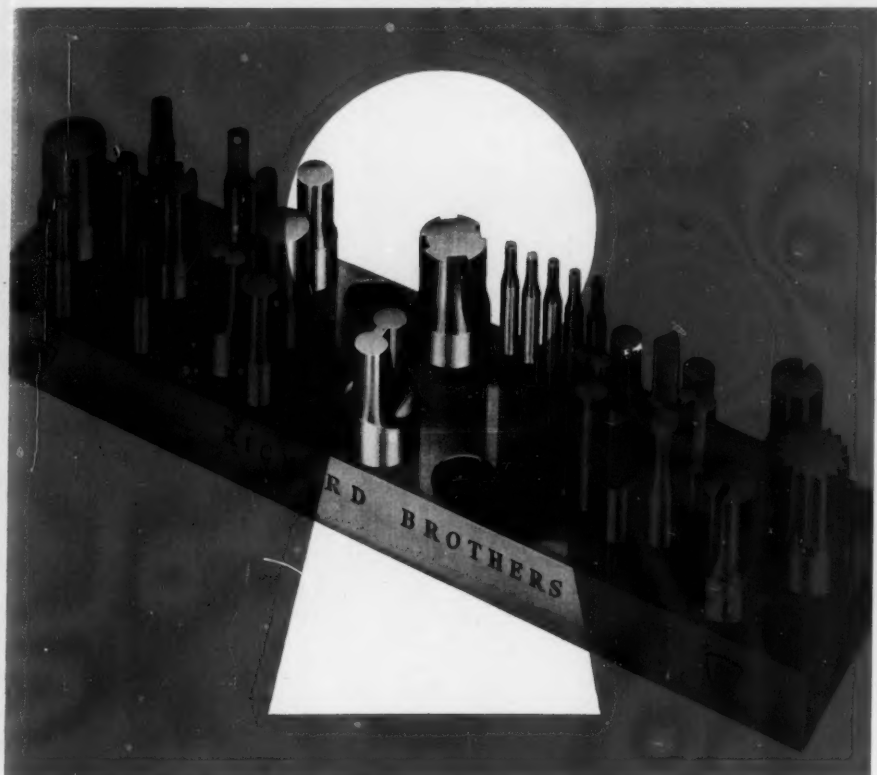
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KEY TO EFFICIENT, ECONOMICAL OPERATION

In any sheet-metal piercing operation where frequent tool change is required, Richard Brothers standardized interchangeable tooling can be the key. Complete interchangeability of standard or special punches and die buttons within the same RB retainers saves time, cuts costs.

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May, 1961

MODERN MACHINE SHOP

183

**modern
machine
shop**

presents the



*Tool
Show*



NEW YORK COLISEUM
MAY 22-26, 1961
NEW YORK CITY

in print...

More than 6,000 time saving, cost cutting products for use on American production lines will be shown at the American Society of Tool and Manufacturing Engineer's Tool Exposition at the New York Coliseum, May 22 to 26. Most of these products are based on recent scientific advances. A parts cleaner designed for cleaning precision missile and electronic parts, for example, uses ultrasonic energy—silent sound—as a source of power. Parts are placed in a tank containing water and a detergent. Ultrasonic energy agitates the solution, causing it to reach even hidden areas in the workpiece. Result—fast, thorough and economical cleaning. Another result is the greater reliability of space age hardware, since imperfect cleaning could cause difficulties.

Advanced computer technology has resulted in the development of fully automatic machine controls and these, too, will be exhibited in abundance at the Exposition. A tape controlled drill press will demonstrate an exhibitor's two axis numerical position control system which will be displayed for the first time at the ASTME exhibit. This same company will display a photocell tape reader. In programming this system only present



ASTME Tool Show . . .

drawings are utilized. Dimensional information is inserted in the tape preparation unit in decimal form. Data is read by photocell tape reader joined in a continuous loop. No reels are required. Information from the tape is then distributed electronically.

Technological advances have also produced automatic weighing systems—another step in automation. One such system to be displayed sorts parts by weight for control of dimension or density. The weighing system can handle parts weighing up to 2.2

lb. and down to 1/30 oz. at speeds of 60 per minute with accuracies of up to 0.15 percent. Parts can be classified in up to 6 classes.

Typical of the instrumentation required for today's high production is a vibration analyzer to be displayed by another firm. The vibration signal analyzer and portable balancer is designed for the study and analysis of vibration sources in machinery, buildings and pipelines. It incorporates modular construction and complete transistorized circuitry for reliable operation and low power consumption.

Other new items to be shown for

1960-61 Officers of the American Society of Tool and Manufacturing Engineers

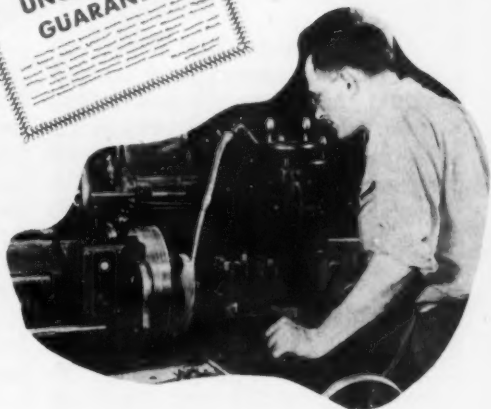


Shown in the above group photograph are: Left to right: H. Dale Long, president; William Moreland, 1st vice president; David A. Schrom, 2nd vice president; Philip R. Mar-

silius, 3rd vice president; Frank F. Ford, 4th vice president; H. Verne Loeppert, treasurer; Francis J. Sehn, secretary. Top right: Harry E. Conrad, executive secretary of the ASTME.

here's the one SOLUBLE CUTTING LUBRICANT that WON'T GO RANCID

**UNQUALIFIED
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and it's backed by an **UNQUALIFIED GUARANTEE**

We absolutely **GUARANTEE** that MACCO 472 MPA will not turn rancid under any circumstances. We are the only manufacturer of soluble cutting lubricants who can make this Guarantee.

IT'S **MACCO 472 MPA***

Ideal for **MACHINING ALL METALS ON ALL TYPES OF EQUIPMENT**

THERE'S NOTHING ELSE LIKE IT!

Hard to believe? You bet! But, it's a fact—backed by experience. One plant with hundreds of machines down 70 days, another 116 days, still another for 6 months (names will be furnished on request)—all started up with the same MACCO 472 MPA solution that was in use when they shut down, and **ABSOLUTELY NO TRACE OF RANCIDITY IN ANY MACHINE!**

With vacation shutdowns coming now is the time to make the change to MACCO 472 MPA. Save yourself a lot of headaches, and some hard earned maintenance dollars to boot. Write or Phone Today for a Macco engineer. He'll give you facts, and make it possible for you to prove for yourself why MACCO 472 MPA is today's No. 1 soluble cutting lubricant in plant after plant. When vacation is over you'll start up with no worry . . . **NO RANCIDITY!**

**And, in addition,
WE GUARANTEE
TO INCREASE
YOUR TOOL LIFE
25%, or more!**

*An Exclusive Development

472 MPA is one more of many reasons why

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MACCO
PRODUCTS COMPANY

9205-mm 5. SANGAMON ST., CHICAGO 20, ILLINOIS
PRESCOTT 9-0800

ASTME Tool Show . . .

the first time at the Tool Exposition include a high speed steel bonded titanium carbide for use as a cutting tool for chip removal operation on steel. A disintegrating machine used for removing broken taps, drills, reamers and other hardened tools from castings, dies and so on, and for piercing shaped holes in hardened dies without annealing and without distorting the castings or dies will also be shown.

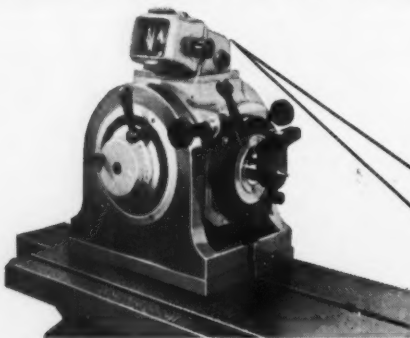
Hours of the Exposition will be 1:00 P.M. to 9 P.M. Monday and Tuesday, May 22 and 23, and 9:00 A.M. to 6:00 P.M. Wednesday, Thursday and Friday, May 24, 25 and 26.

Concurrent with the Exposition will be the Society's 29th Annual

Engineering Conference at the Statler Hilton Hotel, which will feature plant tours, technical sessions, tech tours, a seminar, symposium, and public affairs panel. Fifty papers ranging from welding, forging and cutting metals with explosives to new techniques in grinding will be presented during the conference. Subjects include surface metrology seminar, material removal symposium, manufacturing with numerical control systems, use of computers in manufacturing operations management, application of explosives in metal forming, workhold developments, numerically controlled machining operations, operations research—process planning, machining malleable iron and cast iron, press tooling and die design, heat treating instruments, metal cutting carbides, work simplification, and grinding.

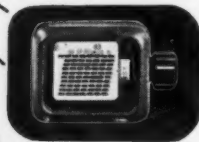
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CENTRE HEIGHT 6 inch
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ACCURACY 1 sec.
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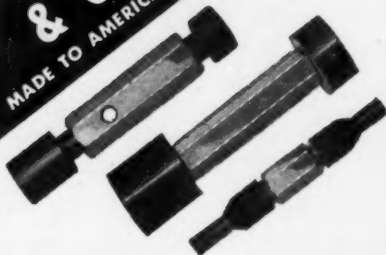
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Program

ASTME 29th Annual Meeting

Technical Sessions

MONDAY, MAY 22

- 9:30 A.M.** RECENT TOOL AND MANUFACTURING DEVELOPMENTS
 Chairman: Julius Schoen, President, Arista Design & Process Corp.
 "FIBER OPTICS—NEW TWISTS IN AN OLD SCIENCE" (Paper 368), by Stephen M. MacNeille, Director of Research, American Optical Co.
 "EFFECT OF CATALYST VARIATIONS ON THE BONDING PROPERTIES OF EPOXY ADHESIVES" (Paper 367), by Kenneth W. Carroll, Manager, Technical Service, Rubber and Asbestos Corp.
- 2:30 P.M.** OPERATIONS RESEARCH
 Chairman: Walter A. Stadler, Director of Manufacturing Research, International Business Machines Corporation.
 "OPERATIONS RESEARCH — CONCEPTS, TECHNIQUES AND APPLICATIONS" (Paper 372), by Nicholas J. Radell, Senior Consultant, Touche, Ross, Bailey & Smart.
 "CASE STUDY IN OPERATIONS RESEARCH MANUFACTURING" (Paper 371), by Gerald J. Demirjian, Operations Research Analyst, Touche, Ross, Bailey & Smart.

TUESDAY, MAY 23

- 9:15 A.M.** PRESS TOOLING PROGRESS
 Chairman: James L. G. Fitz Patrick, Dean, Staten Island Community College.
 "INCREASED APPLICATION OF STRESS DESIGNED RULE TOOLING IN INDUSTRY" (Paper 353), by Lawrence M. Rheingold, President, and Charles F. Hazzard, Vice President, Templet Industries Inc.
 "FABRICATION OF COMPOSITE DIES" (Paper 352), by Joseph F. Quaas, Vice President Research and Manufacturing, Eutectic Welding Alloys Corp.
- 9:30 A.M.** GRINDING
 Chairman: Gerald Abbot, General Manager, Everard Tap & Die Corp.
 "THOSE ELUSIVE MILLIONTHS" (Paper 333), by Harold S. Sizer, Director of Design, Brown & Sharpe Manufacturing Co.
 "A NEW AND REALISTIC LOOK AT GRINDING WHEEL PROCEDURES" (Paper 336), by Carle W. Highberg, Head Diamond Development Engineering, Industrial Diamond Div., Engelhard Hanovia, Inc.
- 2:00 P.M.** AUTOMATION AND NUMERICAL CONTROL
 Chairman: Wallace T. Fullenwider, Production Manager, Austin Electronics Div., The Austin Co.
 "THE EVOLUTION OF THE NUMERICALLY CONTROLLED MACHINING CENTER" (Paper 360), by Carl B. Perry, Product Manager, Industrial Systems Div., Hughes Aircraft Co.
 "ECONOMIC AND TECHNICAL FEASIBILITY ANALYSES FOR AUTOMATION" (Paper 361), by Richard S. White, President, Automation Engineering Laboratory.

WEDNESDAY, MAY 24

- 9:30 A.M.** POWDER METALLURGY
 Chairman: Edward E. Williams, Factory Manager, Graphite Metallizing Corp.
 "SELF LUBRICATING BEARINGS: THE WHYS AND WHEREFORES" (Paper 375), by J. J. Scott, Chief Development Engr., Bound Brook Bearing Corp. of America.

2:15 P. M.

West
Room,
Statler
Hilton
Hotel

NUMERICALLY CONTROLLED MACHINING

Chairman: A. Pelter, Manager, Prototype Shop, Bulova R & D Laboratory, Inc.
"CONTINUOUS PATH TURNING ON NUMERICALLY CONTROLLED LATHES" (Paper 359), by Robert E. McKee, R. K. LeBlond Machine Tool Co.
"NUMERICALLY CONTROLLED TURRET DRILLING" (Paper 355), by Joseph L. Burg, Vice President, Burg Tool Mfg. Co., Inc.

THURSDAY, MAY 25

9:15 A. M.

West
Room,
Statler
Hilton
Hotel

WORKHOLDING DEVELOPMENTS

Chairman: Carl Kertesz, General Manager, Design Tool Co., Div. of Federal Manufacturing & Engineering Corp.
"CLAMPING WITH FIBERGLASS-REINFORCED PLASTICS" (Paper 369), by Jacob Ruppel, Jr., Engineering Department, Accurate Plastic Tooling & Pattern Co., Inc.
"ELECTRONIC FORCE EMPLOYED TO HOLD WORKPIECES" (Paper 370), by Robert W. Waring, President, Electroforce, Inc.

9:30 A. M.

East
Room,
Statler
Hilton
Hotel

APPRAISING THE MANUFACTURING SYSTEM

Chairman: Walter Middleton, President, Production Tool & Methods Co.
"WORK SIMPLIFICATION AT TEXAS INSTRUMENTS—PHILOSOPHY, TRAINING, IMPACT, EFFECTIVENESS" (Paper 364), by Joseph P. Rodgers Jr., Manager Industrial Engineering Dept., and E. W. Hightower, Manager, Work Simplification Branch, Industrial Engineering Dept., Texas Instruments Inc.

2:00 P. M.

East
Room,
Statler
Hilton
Hotel

CUTTING TOOL MATERIALS

Chairman: Raymond Nadrozna, Works Engineer, Ford Instrument Co., Div. of Sperry Rand Corp.
"PHYSICAL PROPERTIES AND APPLICATION OF VARIOUS STEEL BONDED CARBIDE" (Paper 329), by John L. Ellis, Vice President and General Manager, Sintercast Div. of Chromalloy Corp.
"RECENT DEVELOPMENTS IN METALCUTTING CARBIDES" (Paper 328), by James M. Galimberti, Project Engineer, Kennametal, Inc.

2:30 P. M.

West
Room,
Statler
Hilton
Hotel

MATERIAL REMOVAL

Chairman: Arthur E. Stehle, Ettco Tool & Machine Co., Inc.
"NEW HORIZONS IN MACHINING OF MALLEABLE IRON COMPONENTS" (Paper 374), by Hans J. Heine, Technical Director, Malleable Founders Society.
"EFFECTS OF CONSTITUENTS AND CASTING TECHNIQUE ON CAST IRON MACHINABILITY" (Paper 373), by Dimitri Kececiglu, Consulting Engineer, Engineering Services, Industries Group, and George M. Tomko, Associate Engineer, Motor & Generator Dept., Allis-Chalmers Mfg. Co.

FRIDAY, MAY 26

9:00 A. M.

East
Room,
Statler
Hilton
Hotel

TRACER AND NUMERICAL CONTROL SYSTEMS

Chairman: George E. Kaufer, Assistant to the Vice President of Engineering, Polarad Electronics Corp.
"AUTOMATIC INTERNAL OVERRIDE OF FEED RATE IN NUMERICALLY CONTROLLED CONTOURING MACHINE TOOL SYSTEMS" (Paper 354), by Richard P. Bloss, Senior Engineer and James K. Livingstone, Engineering Manager, Director Control Systems, Dage Div., Thompson Ramo Wooldridge Inc.
"UPGRADING TRACER LATHE MACHINE OPERATIONS" (Paper 362), by James B. Bryan, Metrologist; John E. Bowerbank, Jr., Metrologist; Earl D. Holland, Assistant Superintendent of Shops; and Orland Mohl, Machine Tool Specialist, Lawrence Radiation Laboratory, University of California.

9:30 A. M.

West
Room,
Statler
Hilton
Hotel

TOOL ENGINEERING PROGRESS

Chairman: Michael R. Lettieri, Supervisor, Red Bank Div., Bendix Aviation Corp.
"INSTRUMENTS FOR HEAT TREATING" (Paper 332), by Vincent E. Motner, Manager, Manufacturing Engineering, Weston Instruments Div., Daystrom Inc.
"FABRICATION TECHNIQUE OF HIGH-TEMPERATURE PLASTIC EXTRUSION MOLDS" (Paper 377), by Arthur M. Fels, Assistant to V.P., Atlantic Mfg. Co.

Surface Metrology Seminar

MONDAY, MAY 22

This is a two-day program of paper presentations, discussion periods, a problem clinic and an open forum designed to present a comprehensive view of the latest advancements in the fields of surface specifications, surface measurement techniques and future requirements in this field. Ticket: \$45.00 for ASTME members, \$60.00 for others.

9:15 A.M.

SURFACE SPECIFICATIONS

Gold
Ballroom,
Statler
Hilton
Hotel

Chairman: Richard C. Prentice, Production Foreman, Lycoming Div., Avco Corp.
"THE SCIENCE OF SURFACE METROLOGY" (Paper 338), by R. E. Reason, Taylor-Taylor-Hobson Ltd., Leicester, England.

"UNDERSTANDING THE LANGUAGE OF METROLOGY" (Paper 339), by Arnold W. Young, Supervisor, Engis Equipment Co.

10:45 A.M.

SURFACE SPECIFICATIONS AND MEASUREMENT

Gold
Ballroom,
Statler
Hilton
Hotel

"SURFACE FINISH AND OTHER SURFACE SPECIFICATIONS" (Paper 340), by Fred W. Witzke, Cleveland Instrument Co.

"CONTROLLING SURFACE FINISHES WITH INTERFEROMETERS" (Paper 341), by Erwin G. Loewen, Head Metrology Research, Bausch & Lomb, Inc.

2:30 P.M.

SURFACE MEASUREMENT

Gold
Ballroom,
Statler
Hilton
Hotel

Chairman: Harry B. Randall, Jr., Branch Manager, Pratt & Whitney.

"THE APPLICATION OF STYLUS INSPECTION METHODS IN BALL AND BEARING MANUFACTURE" (Paper 346), by Dale A. Cue, Quality Manager, Hoover Ball and Bearing Co.

"THE USE OF PRECISION SURFACE FINISH COMPARISON SPECIMENS" (Paper 345), by Frank R. Bottomley, Fairfield Development Laboratories, Inc.

7:30 P.M.

PROBLEM CLINIC

Ballroom

Registrants can discuss individual measurement problems at this session.

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TUESDAY, MAY 23

9:00 A.M.

SURFACE MEASUREMENT

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Hotel

Chairman: Fred W. Bechtold, Chief Engineer, S. S. White Dental Manufacturing Co.
"THE USE OF ULTRASONICS FOR THE DETECTION OF DISCONTINUITIES" (Paper 347), by John E. Bobbin, Branson Instruments, Inc.
"A MEASURING SYSTEM FOR DISPLACEMENTS OF LESS THAN ONE MICROINCH" (Paper 348), by Gardner P. Wilson, Chief Engineer, Brush Instruments Div. of Clevite Corp.

10:45 A.M.

SURFACE SPECIFICATIONS IN MANUFACTURING OPERATIONS—1

Gold
Ballroom,
Statler
Hilton
Hotel

"EQUIPMENT DESIGN AND MACHINING APPLICATIONS FOR BETTER SURFACE FINISH" (Paper 349), by Clarence Kooistra, Corporate Quality Manager, Marlin-Rockwell Corp.

"PRECISION GRINDING THE REQUIRED SURFACE FINISH" (Paper 342), by Richard J. Levi, President and General Manager, Electro-Autosizing Machine Corp.

1:30 P.M.

SURFACE SPECIFICATIONS IN MANUFACTURING OPERATIONS—2

Gold
Ballroom,
Statler
Hilton
Hotel

Chairman: Jacob H. Sperman, Owner, Sperman Metal Specialties.

"THE APPLICATION OF BURNISHING IN PARTS FINISHING" (Paper 344), by Edwin B. Krause, President, Madison Industries Inc.

"A PREVIEW OF SURFACE REQUIREMENTS AND SPECIFICATIONS FOR THE FUTURE" (Paper 343), by Charles H. Good, Plant Manager, and Frank W. Kabat, Micrometrical Manufacturing Co.


3:15 P.M.

OPEN FORUM DISCUSSION PERIOD

Gold
Ballroom

All speakers will answer questions and discussion problems presented to them by Seminar registrants. Moderators will be announced.

BUTTERFIELD BUTTERFIELD



Sharing the proved performance and long life engineered into the complete Butterfield line, Butterfield reamers cut freely and size holes accurately and uniformly—when used alone or in multiple tool machining. Butterfield production performance like this, plus prompt deliveries and expert technical aid, will reach your plant fast... wherever it's located, whatever you machine... Call your Butterfield Distributor today. Warehouses in Chicago, Detroit, Fort Worth, Los Angeles, New York and San Francisco.

BUTTERFIELD BUTTERFIELD

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Techtours

TUESDAY, MAY 23

Manufacturing with Numerical Control Systems

This one-day program combines technical paper presentations, a tour of Republic Aviation Corporation's numerical control facility and a discussion period. The fee is \$3.00 for ASTME members and \$5.00 for others.

8:30 A.M. SESSION "A"—ENGINEERING PAPERS

Georgian
Room,
Statler
Hilton
Hotel

Chairman: William M. Rynack, Assistant Professor of Automation, New York City Community College.

"AUTO-PROMPT, A THREE DIMENSIONAL SYSTEM FOR NUMERICAL CONTROL" (Paper 358), by Samuel M. Matsa, Senior Analyst, Mathematics & Applications Dept., Data Systems Div., International Business Machines Corp.

"PLANNING A MAINTENANCE PROGRAM FOR NUMERICAL CONTROL EQUIPMENT" (Paper 356), by James J. Childs, Administrator, Machinery Modernization Program, Republic Aviation Co.

"NUMERICAL CONTROL RETROFIT OF MACHINE TOOLS" (Paper 357), by William B. Johnson, Industrial Engineer and Chairman of the Numerical Control Coordinating Committee, Rocketdyne, Div. of North American Aviation, Inc.

12:00 NOON SESSION "B"—ENGINEERING TOUR

Visitors to Republic Aviation Corp. will see a complete battery of tape-controlled machines in action—two conventional profilers, two skin mills and a five-axis profiler. Final assembly of an advanced fighter-bomber will also be seen. All persons taking this tour must be U. S. citizens. Buses depart from the Statler Hilton Hotel at 12:00 noon.

4:40 P. M. SESSION "C"—PANEL DISCUSSIONS

Cornell
Dartmouth
Room

The speakers from the morning sessions and engineers from Republic Aviation will answer questions on numerical control.

WEDNESDAY, MAY 24

High Energy Metalworking

This one-day program on high-energy metalworking combines technical paper presentations, a discussion period and a tour of Grumman Aircraft Engineering Corp. facilities on Long Island. This entire Long Island Day Program, which was arranged by ASTME Long Island Chapter No. 88, will be held at Grumman. Program participants will be guests of Grumman for lunch. The fee is \$3.00 for ASTME members and \$5.00 for others.

8:00 A.M. SESSION "A"—ENGINEERING PAPERS

Grumman
Aircraft
Engineering
Corp.

Chairman: Henry Sjöman, Manufacturing Engineer, Grumman Aircraft Engineering Corporation.

"WELDING, FORGING AND CUTTING WITH EXPLOSIVES" (Paper 350), by Vasil Philipchuk, Manager, Special Products Dept., National Northern Division of American Potash & Chemical Corp.

"EXPLOSIVE, FORMING AT GRUMMAN AIRCRAFT" (Paper 351), by Arthur Wickesser, Jr., Metallurgical Engineer, and Arthur Garmendia, Manufacturing Engineer, Grumman Aircraft Engineering Corp.

"FORMING, FORGING AND COMPACTION OF SPACE-AGE METALS BY CONTROLLED EXPLOSION" (Paper 376), by Guy C. Throner, Manager, Ordnance Div., Aerojet-General Corp., a subsidiary of the General Tire & Rubber Co.

12:45 P. M. SESSION "B"—ENGINEERING TOUR

The highlight of this tour will be an explosive forming demonstration. Other operations that will be seen by visitors are chemical milling, vacuum brazing, various sophisticated welding operations, numerically controlled machining, flow forming and assembly work.

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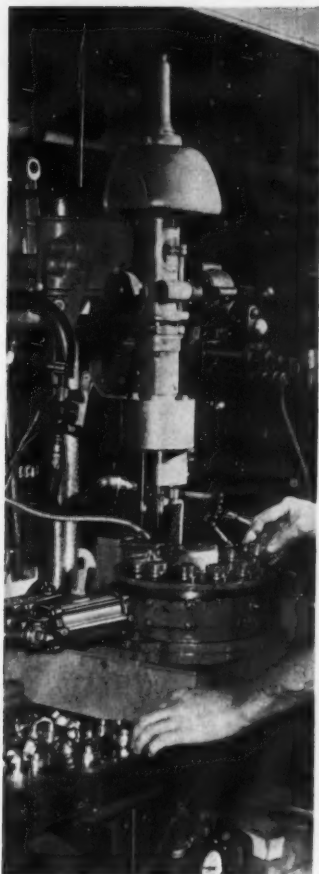
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To get more work out of a drill press you must get more work to it

Actual machining time in drill press operations is fixed by the nature of the tool and material. But the time taken to get work to the tool, and away from it, is the real cost factor. It's here that costs can be cut—profits made.

It's here that two Bellows-Valvair pneumatic devices can help: The Bellows Drill Press Feed to feed the spindle of the drill press; the Bellows Rotary Feed Table to feed parts to the tool and take them away. With these two units installed on your drill press—the operator loads and unloads—while machining goes on.

Every second a cutting tool stands idle while someone loads and unloads a fixture adds unnecessarily to your cost.

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RT-1022. Address Dept. MMS-561
Bellows-Valvair, Akron 9, Ohio

1021-C

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AKRON 9, OHIO
DIVISION OF INTERNATIONAL BASIC ECONOMY CORPORATION (IBEC)

For more data circle 475 on Postpaid Card

May, 1961

MODERN MACHINE SHOP 195

THURSDAY, MAY 25

Manufacturing Operations Management

This one-day program combines technical paper presentations, a demonstration of manufacturing operations management methods at International Business Machines Corp. and a discussion period. The registration fee is \$3.00 for ASTME members and \$5.00 for others.

9:00 A.M.

SESSION "A"—ENGINEERING PAPERS

Georgian
Room,
Statler
Hilton
Hotel

Chairman: Louis Wertman, Assistant Professor of Mechanical Technology, New York City Community College.

"SPECIAL-PURPOSE COMPUTERS FOR MANUFACTURING AND MANUFACTURING PLANNING" (Paper 366), by K. H. Kuhnel, Manager, Austin Electronics Div.

"INVENTORY MANAGEMENT" (Paper 365), by Charles J. Welker, Applications Representative, Midwestern Regional Office, International Business Machines Corp.

"A PRACTICAL SYSTEM FOR WORK LOAD CALCULATION AND PREDICTION FOR SMALL-LOT PRODUCTION SHOPS" (Paper 363), by Arthur P. Kromer, Manager of Manufacturing Engineering, Instrument and Equipment Group, Varian Associates.

12:30 P.M.

SESSION "B"—

IBM

MANUFACTURING OPERATIONS DEMONSTRATION

This phase of the program will be presented at IBM. Six planning and operation functions common to all manufacturing companies—sales forecasting, materials planning, inventory management, factory scheduling of orders, work dispatching on the factory floor, and operation evaluation to determine the effectiveness of billing and shipping planning—will be discussed. Following the discussion, visitors will see a 30-minute demonstration of the IBM management operations system.

3:45 P.M.

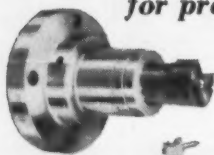
SESSION "C"—PANEL DISCUSSION

IBM

The morning speakers and representatives from IBM will answer questions on manufacturing operations management.

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Symposium

WEDNESDAY, MAY 24

Material Removal Progress

This is a one-day program covering advanced metal-cutting processes and tooling. Copies of the technical papers will be mailed to registrants for study prior to attendance. The speakers will summarize their papers, rather than deliver them in full. Much of the time will be spent discussing questions submitted by the audience. Questions submitted in advance of the meeting will be given preference. The fee is \$3.00 for ASTM members and \$5.00 for others.

9:15 A.M.

East
Room,
Statler
Hilton
Hotel

SESSION "A"—THEORY AND PRACTICE

Chairman Arthur R. Illies, Chief Tool Designer, American Machine & Foundry Co.
"ULTRA HIGH-SPEED AND OTHER METALCUTTING PHENOMENA EXPLORED BY DIAMENSIONAL ANALYSIS" (Paper 331), by Max Kronenberg, Consulting Research Engineer.

"EVALUATION OF CERAMIC TOOLS" (Paper 330), by Donald R. Kibbey, Assistant Professor of Industrial Engineering, and Harry D. Moore, Professor of Industrial Engineering, The Ohio State University.

"METHOD AND APPARATUS FOR APPLYING AN ELECTRIC POTENTIAL TO AN ELECTROLYTIC TOOL" (Paper 337), by John J. Falls, Director of Engineering, The Standard Electrical Tool Co.


2:00 P.M.

East
Room,
Statler
Hilton
Hotel

SESSION "B"—NEW PROCESSES

Chairman: Henry A. Williamson, Mechanical Engineer, Electronics Associates.
"NEW TECHNIQUES OF METAL-REMOVAL THROUGH VIBRATORY FINISHING AND DEBURRING" (Paper 334), by Richard D. Taylor, Eastern Regional Engineer, Lord Chemical & Equipment Div., Wheelabrator Corp.

"ELECTRON BEAM PROCESS FOR SUPERALLOYS" (Paper 335), by Henry A. James, Sciaky Bros., Inc.



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Plant Tours

MONDAY, MAY 22

1:00 P. M.

Tour
No. 1

BROOKLYN NAVY YARD

Visit to aircraft carrier Constellation and to the machine shop, sheet-metal shop and welding shop. Extra large work is handled in all of these shops. Visitors must be U. S. citizens. No cameras permitted. Buses depart from the Statler Hilton Hotel, return to the Coliseum. Tickets: \$2.00.

TUESDAY, MAY 23

8:30 A. M.

Tour
No. 2

ELECTROLUX CORPORATION

Stamping, machining, die casting, material handling and finishing operations will be seen in a plant that manufactures vacuum cleaners and floor polishers. Buses start from and return to the Statler Hilton Hotel. Ticket: \$2.00.

8:30 A. M.

Tour
No. 3

FORD MOTOR COMPANY

Mahwah assembly plant. Visitors will see complete automotive assembly operations. Buses start from and return to the Statler Hilton Hotel. Ticket: \$2.00. (Tour 3a, leaving the hotel at 9:00 A. M. and returning at 12:30 P. M., also covers the Ford Mahwah plant.)

1:00 P. M.

Tour
No. 4

FRED HEINZELMAN & SONS, INC.

Visitors will see automatic hardening, quenching, washing, drying and tempering operations in one of the most modern heat-treating plants in the country. Buses start from the Statler Hilton Hotel and return to the Coliseum. Ticket: \$2.00.

WEDNESDAY, MAY 24

8:30 A. M.

Tour
No. 5

PITNEY-BOWES, INC.

Visitors will view all manufacturing, processing and finishing operations in a plant that makes postage meters. Luncheon will be served in the company cafeteria. Buses depart from and return to the Statler Hilton Hotel. Ticket: \$2.00.

8:30 A. M.

Tour
No. 6

AMERICAN MACHINE & FOUNDRY COMPANY

Visitors will see all sheet-metal, processing, finishing and inspection operations in a plant that utilizes 1100 machine tools. Products of the plant are cigarette and cigar-making machinery, and bread packing, slicing and wrapping machines. Buses depart from and return to the Statler Hilton Hotel. Ticket: \$2.00.

THURSDAY, MAY 25

8:30 A. M.

Tour
No. 7

LYCOMING DIV., AVCO CORPORATION

A tour that covers all manufacturing operations in a gas turbine plant. Some unusual grinding operations will be seen. Buses depart from the Statler Hilton Hotel, return to the Coliseum. A luncheon stop is included on the return trip. Ticket: \$2.00. Visitors must be U. S. citizens.

8:30 A. M.

Tour
No. 8

POUGHKEEPSIE PLANT, INTERNATIONAL BUSINESS MACHINES CORPORATION

At this plant, visitors will see the assembly and testing of large computers and some of the processing operations involved in computer production. Luncheon will be served in the company cafeteria. Buses depart from and return to the Statler Hilton Hotel. Ticket: \$2.00.

1:00 P. M.

Tour
No. 9

ADAMAS CARBIDE CORPORATION

Visitors will see the pressing and sintering of carbides and the production of tool tips, and quality control operations. Buses depart from and return to the Statler Hilton Hotel. Ticket: \$2.00.



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Special Events

MONDAY, MAY 22

7:30 A.M.

Dartmouth
Room,
Statler

CANADIAN BREAKFAST

This breakfast is sponsored by the ASTME chapters of Canada for Canadian members and visitors and their guests.

12:00 NOON

Grand
Ballroom,
Statler

FIFTH ANNUAL ELI WHITNEY MEMORIAL LECTURE

Speaker: Wallace E. Brainard, Chief Engineer, Servo Machine Tool Div., Kearney & Trecker Corp.

SUBJECT: "PUT THE SKILL IN THE MACHINE"

Ticket: \$6.00.

TUESDAY, MAY 23

9:00 A.M.

Penn Top
Ballroom

ASTME BOARD OF DIRECTORS ANNUAL MEETING

All members are welcome.

2:00 P.M.

Columbia
University
Campus

PUBLIC AFFAIRS FORUM

"RACE FOR MANUFACTURING SUPREMACY." Experts from industry, government and education will give first-hand reports on advances made by Russian technologists and engineers, based on recent visits to Russian manufacturing plants. Russian progress will be compared with our own. No charge. Everyone is welcome.

WEDNESDAY, MAY 24

9:00 A.M.

Gold
Ballroom

ASTME BOARD OF DIRECTORS ANNUAL MEETING

All members are welcome.

6:30 P.M.

Terrace
Ballroom,
Statler
Hilton
Hotel

ASTME ANNUAL BANQUET AND NATIONAL MEMBERSHIP MEETING

All members, visitors and their wives are welcome. This function starts with a social hour in the Terrace Ballroom of the Statler Hilton Hotel beginning at 6:30 p.m. Dinner will be served at 7:30 p.m. Following dinner H. Dale Long, ASTME President, will install the newly elected officers. Ticket: \$10.00 per person.

THURSDAY, MAY 25

12:00 NOON

Canada
Room,
New
York
Coliseum

EDUCATOR'S CONFERENCE LUNCHEON

This luncheon is sponsored by the ASTME National Education Committee. In a talk, "Creative Engineering" Melvin Sudheimer of General Motors Corporation's Saginaw Steering Gear Div., will discuss and illustrate the relationship of all engineering activities—from the initial product design concept through manufacture of the end product—in a typical American industry. Attendance by invitation.

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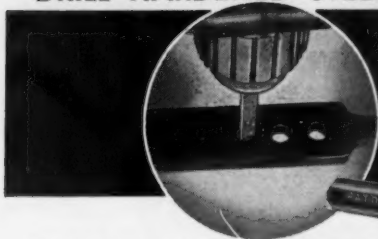
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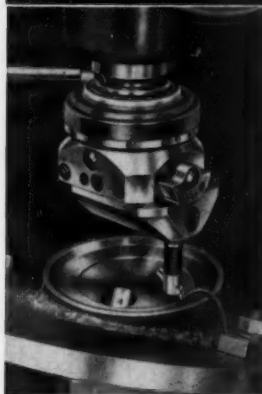


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Ladies' Activities

MONDAY, MAY 22

10:30 A.M.

Hartford
Room,
Statler

GETTING TO KNOW YOU

Initial get-acquainted party. No charge. Coffee and sweet rolls will be served.

1:00 P.M.

SHIP AHOY

A tour of Brooklyn and the Brooklyn Navy Yard. Visit to an aircraft carrier. Walking shoes recommended. No luncheon stop. Ticket: \$2.00.

TUESDAY, MAY 23

12:45 P.M.

ANCHORS AWEIGH

A sightseeing cruise around Manhattan Island. Participants will see the New York Skyline and bridges, Gracie Mansion (the Mayor's home) and the Statue of Liberty. There will be no luncheon stop but light snacks will be available aboard the ship. Ticket: \$3.00.

WEDNESDAY, MAY 24

1:00 P.M.

NEW YORK, NEW YORK

Tour covering Times Square, Herald Square, Greenwich Village, the Bowery, Civic Center, City Hall, Lower Broadway, St. Paul's Chapel, Trinity Church and Bowling Green. The trip will also include a walking tour of Chinatown and a guided tour of the Stock Exchange. No luncheon stop. Walking shoes recommended. Ticket: \$3.25.

THURSDAY, MAY 25

10:00 A.M.

UNITED NATIONS


Guided tour of the United Nations Building, with the possibility of sitting in on a UN session. Luncheon is dutch treat, in either the Delegates Dining Room or the Coffee Shop, as preferred. There will be time to browse through the shops and the arcade in the UN Building. Ticket: \$2.50.

FRIDAY, MAY 26

10:00 A.M.

DESIGN-O-RAMA

This tour will visit the Design Center for Interiors. Visitors will see a display of the latest products in all interior design fields. Coffee and sweet rolls will be served. The tour also includes a visit to the Guggenheim Museum, housing an extensive collection of Twentieth Century nonobjective art. Walking shoes recommended. No luncheon stop. Ticket: \$2.75.



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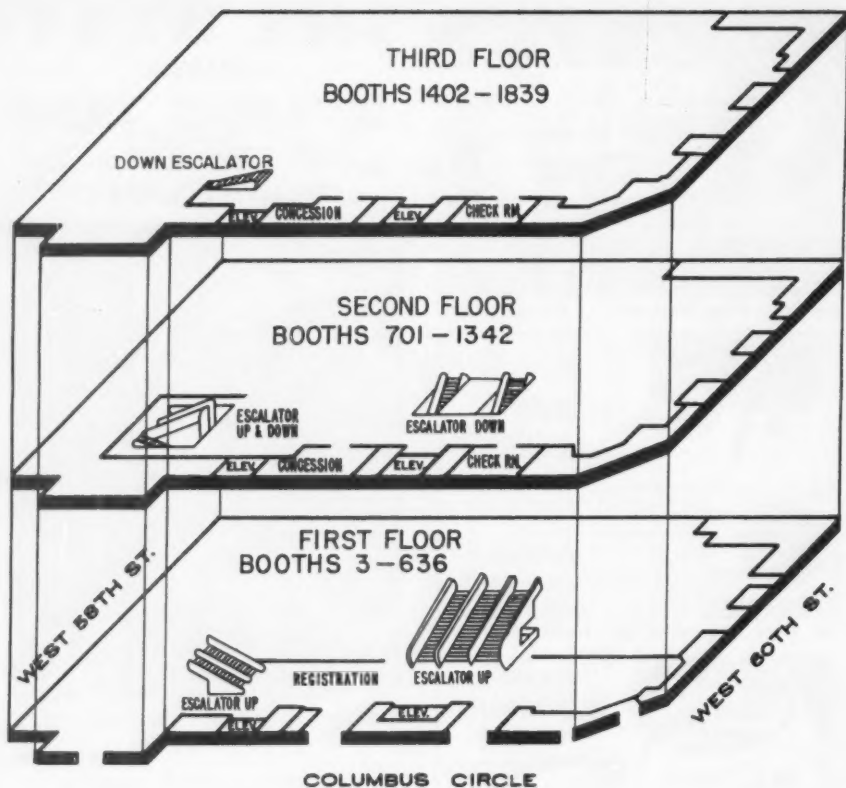
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List of Exhibitors

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A. A. Gage Co.	2518	Aero Service Corp.	3821
Aaron Machinery Co.	1615	Aget Mfg. Co.	3922
Accurate Bushing Co.	2254	Airetool Mfg. Co.	1441
ACF Electronics Div.	1623	Alameda Gage Co.	3518
Advance Products Corp.	3302	Allegheny Ludlum Steel Corp.	2233
		Aloris Tool Co., Inc.	3839
		American Drill Bushing Co.	2022

Company Name	Booth No.	Company Name	Booth No.
American Machine and Foundry, AMF Tool & Lowerator	3515	Cerro Sales Corp.	1525
American Machinist Metalworking Mfg.	2033	Challenge Machinery	2605
American Metal Market	3927	Charmilles Engrg. Wks.	1604
American Sip Corp.	2246	Cincinnati Milling Machine Co.	1614
American Twist Drill	1315	Cincinnati Sub Zero Products	2002
American Pullmax Co.	2012	Claremont Co., Inc., R. E.	3946
Ameurope Inc.	3502	Clark, Cutler & McDermott	1033
Amitool Co., Inc.	2646	Clearing Div. of U. S. Industries, Inc.	1440
Andrews Tools & Mchry.	2617	Clementina, Ltd.	2618
Antares Instruments, Inc.	3938	Cleveland Instrument Co.	1428
Apex Machine Co.	2625	Collier, Inc., P. F.	3911
Armstrong Bros. Tool Co.	3906	Coil Winding Equipment Co.	2601
Assoc. American Winding Machinery	2506	Collins Microflat Co.	3226
ASTME Center	2522	Columbia International Co.	1308
Atlas Press Co., Clausing Div.	2434	Commander Mfg. Co.	3209
Austin Industrial Corp.	1205	Consolidated Kinetics Corp.	1331
Automatic Mill, Inc.	3233	Cooper-Weymouth, Inc.	1239
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Avildsen Tools & Machines, Inc.	3136	Cralely Mfg. Co., C. C.	2010

- B -

E. R. Bachmann Co., Inc.	2202
Balcrank, Inc.	3237
Barer Engrg. & Machry.	2127
Beaver Pipe Tools	3822
Bellows Valvair Corp.	2517
Beloit Tool Corp.	3702
Bendix Corp.	1414, 1428
Bentley Industrial Corp.	2117
Boeing Applied Computing Service	2037
Boggis Co., H. P.	2642
Boyar-Schultz Corp.	2009
Bridgeport Machines, Inc.	1215
Bristol Co.	3318
Brown & Sharpe Mfg. Co.	1315
Buck Tool Co.	1222

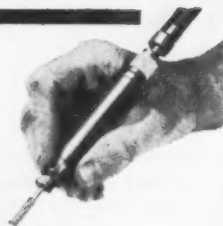
- C -

Canton Chemical Co.	3238
Carr Lane Mfg. Co.	1035
Cavitron Equip't. Corp.	2533
Cawi Machine Co.	3905
Cazeneuve Lathe	1328

Davey Compressor Co.	1011
Davidson Optronics	3833
Dayton Perforators	1522
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Devcon Corp.	2134
DeVlieg Microbore, DeVlieg Mach. Co. ..	1314
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Diehl Mfg. Co.	2135
DoAll Co.	2222
Doeden Tool Corp.	2016
Dorsey Gage Co.	3814
Dow Mechanical Corp.	3507
duMont Corp.	3215
Dumore Co.	2428
Dunham Tool Co.	2610
Durant Tool Co.	3126

- D -

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count on Airetool's midget pneumatic die grinders for intricate, accurate grinding, filing and cutting. Two compact, ultra high speed models . . . models 200 (60,000 rpm) and 300 (38,000 rpm) . . . with vibration-free power. Lightweight, easy to handle. Complete line of accessories.

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Rugged Airetool pneumatic production tools, like this 400-T tapper, stand up under tough production schedules . . . hour after hour . . . day after day. The new 400-T is the perfect tool for fast, efficient sheet metal tapping.

AIRETOOL *makes the difference*

Because Airetool's complete line of air-powered production tools speed production, cut "down-time", improve quality. When you want production . . . you need Airetool. For full information, write



Representatives in principal cities of the free world

For more data circle 494 on Postpaid Card

208 MODERN MACHINE SHOP

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Englehard Hanovia	2650
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Erico Products, Inc.	3609
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Farrand Controls, Inc.	2429
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Fenway Mach. Co.	3206
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Gleason Works	3717
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Grobet File Co. of America, Inc.	3116
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Hamilton Watch Co.	3212
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Booth No.

Company Name

Booth No.

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Lassy Tool Co.	1728
Laurel Corp.	2615





Clipper Diamond Products

Clipper can offer today the most complete line in our history of diamond tools (including special applications), diamond drills and diamond wheels ... using Natural, Man-Made or SND diamonds, with improved bonds in Resin, Metal or exclusive Ceramet (vitrified).

Literature sent on request.

CLIPPER DIAMOND TOOL CO., INC.



345 Hudson Street, New York 14, N. Y.

For more data circle 495 on Postpaid Card

List of Exhibitors . . .

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M & M Tool & Mfg. Co.	2632	Mettler Instruments	3514
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Mahr Gage Co.	2209	Micro Balancing, Inc.	2627
Malcus Tool Corp.	3234	Miller Fluid Power Div.	2221
Manex Machry. Corp.	1706	Minnesota Mining & Mfg. Co.	3701
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		Montgomery & Co.	1223
		Moog Servocontrols, Inc.	1430
		Muskegon Tool Industries.....	1122



SPRING PLUNGERS are now available in four types and thirty-four sizes. Black Penetrate Nose with standard spring pressures, 6-32 thru 1"-8 threads. Cadmium Plate Nose with light spring pressures, 6-32 thru 1"-8 threads. Black Nylon Nose with standard spring pressures, 8-32 thru 5/8"-11 threads. White Nylon Nose with light spring pressures, 8-32 thru 5/8"-11 threads. Northwestern Tools, Inc. 118 Hollier Ave., Dayton 3, Ohio.



PLASTIC BALL KNOBS with brass inserts are now available in four diameters and twelve threads sizes. 3/4" diameter with 10-32 threads. 1" diameter with 1/4-20, 1/4-28, 5/16-18 or 5/16-24 threads. 1 3/8" diameter with 3/8-16, 3/8-24, 1/2-13 or 1/2-20 threads. 1 7/8" diameter with 1/2-13, 1/2-20 or 5/8-18 threads. Northwestern Tools, Inc. 118 Hollier Ave., Dayton 3, Ohio.



SWING "C" WASHERS complete with shoulder screws, are now available in four sizes for 3/8", 1/2", 5/8" or 3/4" bolt sizes. Write or call today for your free new 16-page catalog. Catalog includes tracing templates of jig and fixture components. Northwestern Tools, Inc. 118 Hollier Ave., Dayton 3, Ohio.

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Company Name

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Portage Double Quick Co., Inc.	2622
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Precision Welder & Flexopress Corp.	2454
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Rheem Mfg. Co., Electronics Div.	3510
Richards Co., J. A.	1631
Riggs Co., Wm. L.	1345
Rowe Machinery & Mfg. Co., Inc.	2307
Rudel Machinery Co.	2421

May, 1961



**balance
ROTATING
PARTS
faster...
easier...**

Supersensitive Anderson Balancing Ways (Stand or Pillow Block Type) will static-balance rotating parts easier, faster, more accurately. No setup, no leveling, no centering. Glass-hard spindles and bearings prevent wear or ball-bearing indentations when balancing heavy work. Superior accuracy lasts throughout long life. Proved and preferred over 40 years.



Anderson

HAND SCRAPERS

Anderson Hand Scrapers are: (1) faster cutting, (2) easier to use, (3) just the right spring, (4) palm fitting grip, (5) 18" - 20" - 22" lengths. Saves costly regrounding.

\$6.75 (18") with high speed blades

\$9.85 (18") with carbide-tipped blades

\$1.75 for rubber bumper shown below



Write for Bulletin 5-22

**ANDERSON BROS.
MFG. CO.**

Rockford, Ill.

For more data circle 497 on Postpaid Card

MODERN MACHINE SHOP 211



New \$300 precision cut-off saw paid for itself in 15 minutes

Navkut*, the new precision cut-off saw, cut production costs of "spacers" substantially at Unicorn Engineering Inc. (now owned by Computer Measurements Co., Sylmar, Calif.) The cost of spacers was reduced from \$8 to 80c each by Navkut's simple cut-off operation. During every 15-minute production run, the Navkut saw paid for itself. Such results aren't unusual with Navkut, the saw that can cut parallel tolerances to within .002" in ferrous, non-ferrous, wood, and plastic materials with only two types of blades. Usually the cut finish and accuracy will be so precise there is no need for milling or grinding. All this, yet the Navkut saw costs only \$300. See for yourself how it can save you money. Write today for a free 15-minute demonstration in your shop.

*TRADEMARK

Navkut saw is another product marketed by:



NAVAN PRODUCTS INC.

Subsidiary of
North American Aviation, Inc.
900/1 North Sepulveda
El Segundo, California

For more data circle 498 on Postpaid Card

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- U -		Wadell Equipment Co., Inc.	1040
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Uddeholm Co. of America	2121	Watts Regulator Co.	2006
Ultramatic Equipment Co.	3509	Wespe Div., Vlier Engrg. Co.	2122
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United States Leasing Corp.	3412	Wesco Tool, Inc.	1141
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		Wilson Co., Thomas C.	1218
- V -		Wilton Tool Mfg.	3838
VDF Lathe Div., Rudel Machinery	2246	Winslow Products Engrg.	1240
Van Keuren Co.	3218	Wintriss, Inc.	1235
Vernon Devices, Inc.	3120		
Vidmar, Inc.	2545	- Z -	
		Zero-Max Co.	2025

NUMBERALL

CUTS THE COST OF STAMPING NUMBERS

DETAIL CHASE and PUNCH
for Quick Stamping of Nameplates



MODEL 24

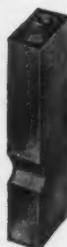
An ingenious tool for rapid stamping of plain, etched or embossed nameplates. Used in a small Kick or Power Press, or in our No. 93 or No. 131 Bench Press. Steel Type and Logo Type are dropped into recess. Logo Type are used for numerical and letter combinations.

All lines are stamped in one operation, making tool very efficient. Small, as well as large lots can be stamped economically, neatly. Write for Bulletin MS-24.

We can also make steel type with round face characters.

IMPROVED TYPE HOLDERS

for
stamping
into
Metal, etc.



STEEL
TYPE

Hand or Press style. Type can be easily, quickly loaded and unloaded. Simplest construction . . . Just a sturdy pin holds the type securely. No screws nor springs. Super-quality steel type made in various sizes: $\frac{1}{32}$ " up to $\frac{1}{2}$ " figures and letters. Write for Bulletin MS23H.

NUMBERALL STAMP & TOOL CO.
HUGUENOT PARK STATEN ISLAND 12, N. Y.

Steel type and wheels available with round face characters.

For more data circle 499 on Postpaid Card

On Display at the

Descriptions of products to be shown at the American Society of Tool and Manufacturing Engineers' Show, May 22-26.

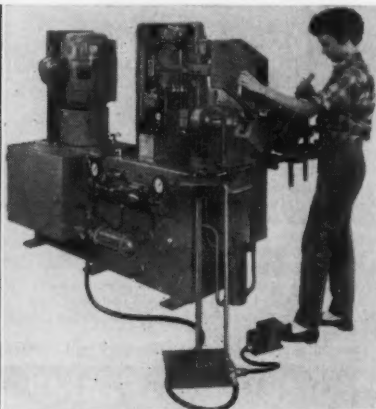
END-FINISHING, BENDING AND END-SPINNING MACHINES

Simultaneous deburring, chamfering, and facing both ends of 1 inch diameter tubing at rates up to 3,000 ends an hour will be demonstrated on the Model 666 double-end finishing machine, to be exhibited by Pines Engineering Co., Inc., 646 Walnut St., Aurora, Ill., in Booth 2019. Progressive bending at rates up to three times faster than on conventional equipment will be shown on the Pines Model 3-T Hi-Speed Bending Press. The new Model 660 machine will be end-spinning attractive, permanent closures in aluminum tubing at speeds of 400 to 500 ends an hour.

Filling the need for a high production, extremely accurate, flexible machine, the Model 666 handles double-end finishing operations on tube, rod,

and pipe in diameters from $\frac{1}{2}$ inch minimum to 3 inches maximum. The standard bed machine accommodates lengths from $2\frac{1}{2}$ to 60 inches. Lengths up to 120 inches are handled by the extended bed machine. End-to-end tolerances are consistently held within 0.005 inch on a production basis. Typical production rates range from 2,400 to 3,000 ends (1,200 to 1,500 finished parts) an hour. Workpieces are automatically fed into the proper machining position by means of the hydraulically operated Chute-Matic feed mechanism.

The Pines Model 3-T Hi-Speed Bending Press will be set up and in operation, producing a typical frame section for metal furniture. Unusually compact, this machine requires only 10 square feet of floor space, yet is said to produce bends up to three times faster than conventional equip-



(Left) Pines Double-End Finishing Machine and (Right) 3-T Hi-Speed Bending Press

ASTME Tool Show

ment. Good quality bends are produced in work up to 1 inch o.d. by 16 gauge (0.065 inch) wall steel tubing or its equivalent.

The economical Model 660 spinning machine will be in operation, producing spin closures on the ends of aluminum tubing. This new air operated machine produces smooth, sturdy closures in up to 1 inch o.d. by 0.042 inch wall aluminum tubing at rates of 400 to 500 ends an hour. The spin closing operation uses only $\frac{1}{4}$ inch from the tubing length. Walls of each closure are formed to more than double the original wall thickness.

For more data circle 84 on Postpaid Card

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LUBRICANTS

The exhibit of Texaco, Inc., 135 East 42nd St., New York 17, N. Y., will be in Booth 3146. It will feature industrial lubricants used in the tool industry. The theme of this exhibit will be organized lubrication and the many savings this makes possible in operating costs of equipment. These include savings in the cost of lubricants, reduced maintenance costs, longer equipment life and decreased down-time.

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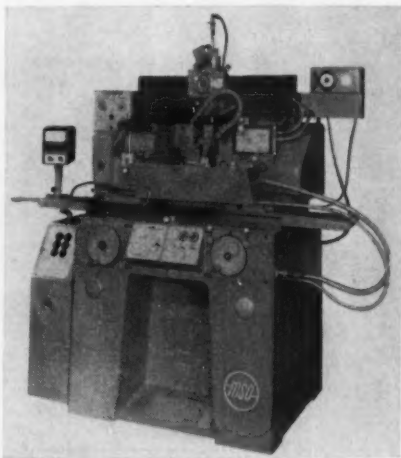
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JIG BORERS, GRINDERS AND MILLERS

In Booth 1205, Austin Industrial Corp., 76-H Mamaroneck Ave., White Plains, N. Y., will exhibit the MSO Cylindrical Grinder, Model FH-100, with electro-hydraulic servo control, which has been designed for production grinding of ultra-precision parts with capacity of $3\frac{1}{2}$ by 12 inches. The

FH-100 is available either as plain or universal grinder. Its exceptional flexibility, ease of set-up and operation makes this grinder equally efficient on short and long run jobs. In addition to manual operation, the FH-100 grinder provides automatic cycling with rapid advance of wheelhead, rough and finish feeds at predetermined feed rates, variable spark-out period, rapid retraction of wheelhead, synchronized with start of workhead and wheel spindle rotation, table traverse and coolant flow, with automatic switch-off of all components upon completion of cycle.

Austin will also display MSO Production Grinder, Model FH-200/750, capacity of 10 by 30 inches; MSO Universal Grinder, Model FMES, capacity of 7 by 12 inches; MSO Optical Coordinate Jig Borer, Model PFRL, table capacity of $33\frac{1}{2}$ by $18\frac{3}{4}$ inches; SAJO Universal Miller, Model 52, with Toolmaker's Overarm, table ca-



Electro-Hydraulic Cylindrical Grinder

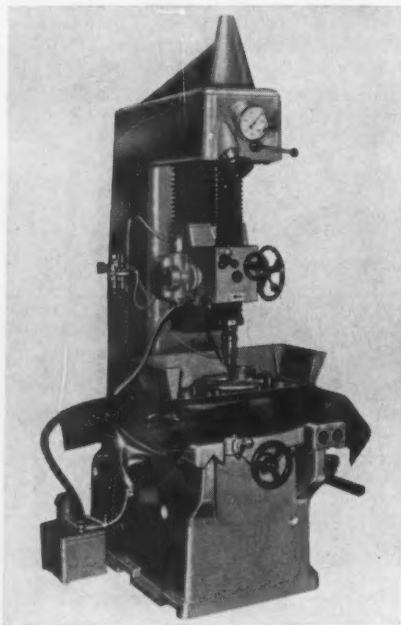
ASTME Tool Show . . .

capacity of 41½ by 9¼ inches; No. 2 SAJO Vertical Miller, Model 54, table capacity of 52 by 11¼ inches and SAJO Production Miller, Model APF-54, table capacity of 52 by 11¼ inches. For more data circle 86 on Postpaid Card

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BORING, GRINDING AND MILLING MACHINES

Manex Machinery Corp., 204 Central Park South, New York 19, N. Y., in Booth 1706, will exhibit the Manex Optical Jig Borer and Jig Grinder, an exceptionally high precision machine, that can do boring and grinding without resetting the workpiece and has automatic reciprocating movement of the table for precision grinding. Grind-



Manex Optical Jig Borer used as jig grinder

ing attachment is optional. It can be installed any time and provides automatic reciprocating movement of the spindle for precision grinding with 5 to 90 strokes per minute.

The Manex VR2 High Speed Vertical Milling Machine with 16 spindle speeds from 85 to 5700 r.p.m. will also be shown. Other products to be exhibited include the Manex VR3 Vertical Milling and Boring Machine with 12 spindle speeds from 50 to 2200 r.p.m.; and the Manex FR3 Vertical Milling and Boring Machine with power feeds and rapid traverses in all directions. Castings on all Manex machines are Meehanite. All tables on milling machines have reverse lead nut screw device with 3-inch diameter lead screw running in oil cup. All gears are hardened and ground.

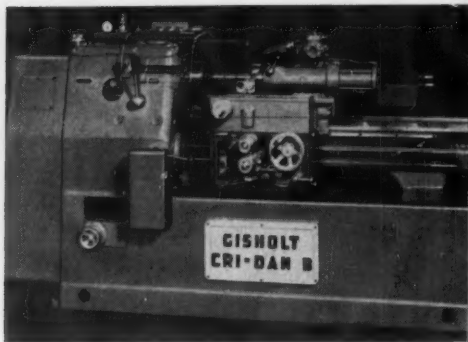
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AUTOMATIC THREADING LATHE

Tracing and threading in one fast automatic cycle will be featured in Booth No. 2537 by Gisholt Machine Co., Madison 10, Wisconsin.

A Gisholt Cri-Dan "B" Automatic Threading Lathe, equipped with a tracer, will be used to show how threading costs can be cut in the small



Cri-Dan "B" Automatic Threading Lathe

job shop as well as the high production plant. The setup will demonstrate how single-point carbide tools can be used to produce highly accurate, quality threads and fine finishes in all materials at rates far faster than possible with thread grinding or thread milling. Fast 8 to 15 minutes setups will be made on request to demonstrate how single or multiple-start, coarse or fine, left or right-hand, straight or tapered threads can be cut, right up to shoulders, on practically all types of internal or external threading operations, it is claimed.

The workpiece will be a 10¼ inch long, 1½ inch diameter diesel engine stud. Material will be LaSalle Stress-proof Steel Bars with copper. The work will be held in a collet with tail-stock support. During the demonstration cycle the tracer attachment at the rear will turn the stepped o.d. in one pass at 0.008 inch feed, 580 s.f.m., in only 54 seconds. Then the 2¼ inch long, 1½ inch diameter, single-start, 8 t.p.i. thread will be produced from the front threading slide. The single-point carbide threading tool will complete the thread in 20 automatic passes (with 0.004 inch infeed per pass) in only 36 seconds. Total f.t.f. time . . . only 1 minute 40 seconds. For more data circle 88 on Postpaid Card

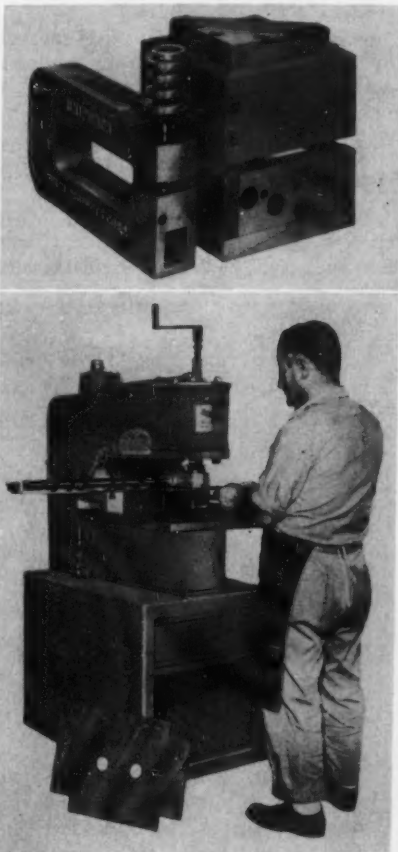
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PUNCHING EQUIPMENT

In Booth 1532, Punch Products Corp., 370 Babcock St., Buffalo 6, N. Y., will introduce a complete line of Unipunch Series "HZ" Horizontal Hole Punching Units and the Unipunch Universal Punch and Die Sharpener. These new Unipunch Series "HZ" Hole Punching Units are designed for punching round and shaped holes in flanges of angles and other formed parts. The punch in this type unit travels horizontally and the die, stripper spring, lifter spring and guide are located in a horizontal posi-

tion in the holder. Unipunch Series "HZ" Hole Punching Units are available in a complete range of holder widths up to 2 inches for punching up to ¼-inch mild steel.

The new portable, bench-type Unipunch Universal Punch and Die Sharpener is equipped with a built-in universal fixture to provide a handy, convenient, economical method for sharpening punches and dies. This sharpener accepts most makes and



(Top) Hole Punching and Notching Units;
(Bottom) Unipunch Air-Hydraulic Press

ASTME Tool Show ...

types of standard and special punches and dies.

Punch Products will also exhibit its complete line of Unipunch Series "A" and "B" Hole Punching and Notching Units with standard 8 $\frac{3}{8}$ -inch shut height and 3 $\frac{1}{2}$ -inch die height and 5 $\frac{1}{2}$ -inch shut height and 2 19/32-inch die height respectively.

Also to be exhibited in operation will be the Unipunch 10-ton Air-Hydraulic Press equipped with Unipunch Unitized Tooling ideal for low or medium production runs and experimental work.

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HONING MACHINE

Sunnen Products Co., 7924 Manchester Ave., St. Louis 17, Mo., will feature actual working demonstrations



Sunnen Honing Machine of Versatile Design

of a new, more versatile honing machine in Booth 1515. Manufacturer reports that this new heavy duty machine has a wider range of "easy-to-select" spindle speeds and a double reduction belt drive that delivers full power from a $\frac{1}{2}$ h.p. motor to the spindle at all operating speeds. This drive is fully enclosed to promote safety, improve appearance and insure a long-life of trouble-free service. An additional control permits more sensitive adjustment of light, stone cutting pressure.

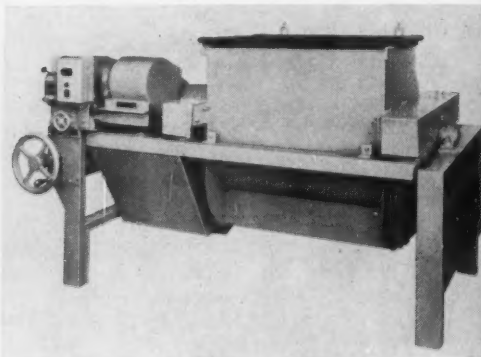
The new honing machine is said to be able to handle any honing applications on 0.100 to 2.625-inch bores with standard tooling available from stock. Bores to 5.500-inch can also be honed with tooling built to order.

For more data circle 90 on Postpaid Card

★ modern machine shop ★

FINISHING TUB AND TUMBLING BARREL

In Booth 3701, Minnesota Mining and Manufacturing Co., 900 Bush Ave., St. Paul 6, Minn., will exhibit the new "Honite" brand Vibrahone finishing tub for finer finishing of a wide range of surfaces. The rubber lined tub is detachable and tilts for easy draining. All moving parts are



"Honite" Brand Vibrahone Finishing Tub

guarded for maximum protection.

Exact control to obtain a wide range of finishes is possible with a new vibrating-rotating tumbling barrel also to be exhibited. The "Honite" brand Vibrothone barrel is equipped with variable speed drive and motor to give the operator simultaneous control of frequency and degree of vibration.

Automatic control of tumbling cycles, automatic separation and media re-

tention and automatic discharge of finished parts are features of a 36-inch sawdust barrel, another product to be exhibited. Additional automation is afforded with a storage hopper and power loading equipment. Both are optional. The "Honite" brand automated barrel is designed to minimize hand labor in batch drying and polishing metal parts. Gas heats the drum.

For more data circle 91 on Postpaid Card

New Ease in Hardness Testing

with this Steel City
Brinell Machine

- LOW-COST
- HYDRAULIC
- MOTORIZED
- POSITIVE ACCURACY

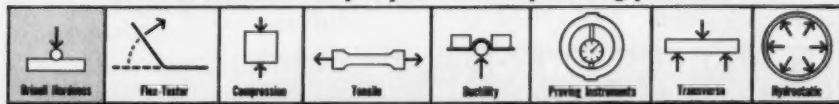
Now, even smaller shops can do Brinell hardness testing with a bench-mounted machine combining operating economy, control simplicity, high accuracy. Tests made with only finger-tip pressure. Operators cannot apply load too fast or overload. Stroke of $\frac{3}{4}$ " permits anvil height to remain fixed when testing series of pieces of almost equal thickness. Load, provided by motorized hydraulic pump, is accurately controlled by time-tested relief valve. Load verified on sensitive hydraulic load gage.

Distributors in most
major metalworking areas

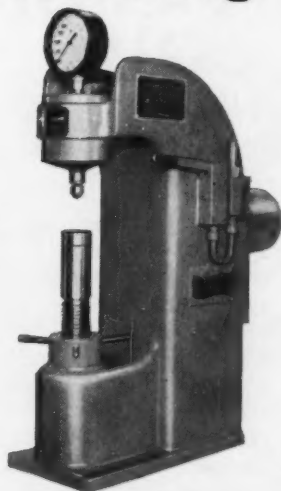


8823 Lyndon Ave., Detroit 38, Mich.

Write or call Steel City if you have any testing problem.



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ALSO AVAILABLE IN
DEAD WEIGHT MODEL

Either bench or floor-mounted, hand-operated or motorized. Operation is simple, fool-proof, with highest accuracy assured. Brinell loads can be changed frequently without loss of accuracy.

ASTME Tool Show . . .

MACHINE TOOLS AND CUTTING TOOLS

In Booths 1322 and 3219 Jarvis Corp., Middletown, Conn., will display its machine tools and attachments, H.S.S. taps and carbide tools, among them is a new extra light duty, compact adjustable drilling and tapping head. The head is a gear driven double eccentric type and is offered as stand-

ard with two to six spindles. Minimum center distance on the two spindle head is $\frac{5}{8}$ inch with a 1 inch minimum for the four spindle unit. The head is designed for use on bench type drill presses as well as floor models. Added to the other end of the line is an extra heavy duty, adjustable head of the same basic design with 1 inch diameter drill capacity, two to six spindles.

This head, heaviest of the adjustable group, was designed for applications

where work patterns are varied, and heavy duty drilling capacities are necessary. Featured as the most important addition is the Jarvis DrillKing, a floor type self contained universal joint drilling and tapping machine designed for light duty applications. Some of the features of this unit are a 6 by 8 inch work area, twelve spindle drivers, minimum center distances of $\frac{5}{16}$ inch four speed selections and "T" track vertical feed table. In addition to standard adjustable arm assemblies, accurately jig bored cluster plates are made available for very close tolerance work.

For more data circle 92 on Postpaid Card

THE NEWEST JOHANSSON

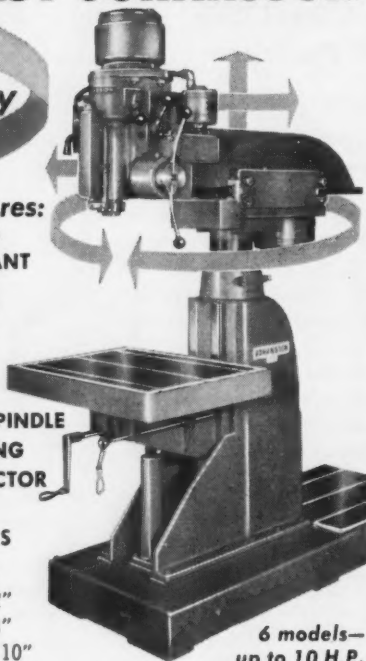


Check these features:

- ★ 2 WORK STATIONS
- ★ GEAR DRIVE—INSTANT SPEED SELECTION
- ★ EXCLUSIVE—RAM & COLUMN LOCKS
- ★ POWER COLUMN ELEVATION
- ★ POWER FEED TO SPINDLE
- ★ AUTOMATIC TAPPING
- ★ BUILT-IN TOOL EJECTOR

SPECIFICATIONS

Radial Arm 2½, 3, 4-foot
Column Diameter 6"-12"
Drill Capacity UP TO 3"
Spindle Travel 5"-10"
Spindle Speeds (8 or 16) Ranges from 34 RPM Low to 4000 RPM High
Spindle to Work Surf., Max. 54"
Spindle to Work Surf., Min. 3½"-6"



6 models—
up to 10 H.P.

Send for
catalog

I. O. JOHANSSON CO.

7240 ST. LOUIS AVE., SKOKIE, ILL.

**JOHANSSON
MACHINE TOOLS**

For more data circle 501 on Postpaid Card

For { **8-STATION PRODUCTION MACHINING**
1½" BAR AND COLLET WORK
CHUCKING
SINGLE POINT THREADING

Costs { **\$7,167⁰⁰**
FOB Factory
Complete with all
standard equipment

This is an all new 1½" bar capacity ram type turret lathe with power feeds to all 8 working stations . . . that in addition to bar and collet work also has the versatility to do chucking, and when needed, single point threading. Powered by a 5 h.p., two-speed, geared motor, the new Sheldon 3 R turret lathe provides 16 spindle speeds, 60 different feeds to the carriage and cross-slide, and 180 different feeds to the ram turret.

The turret itself is ruggedly built and accurately machined to provide close tolerance indexing. And for complete ease of operation, it is put under power by simply pressing a push button on the control panel.

This new 3 R Sheldon is completely equipped with two-speed motor and electrical controls, coolant system and splash guards, LO spindle nose, large satin chrome dials and hardened bed ways. It also provides an additional cost saving feature—each turret face is drilled and tapped for your standard flange type tooling as well as being bored for your standard 1½" shank type tooling.

For versatile, accurate machining in either long or short runs, the new Sheldon 3 R provides the answer to low investment cost with high profit operation.



Write for bulletin with complete specifications and tooling data

SHELDON MACHINE CO., INC.
4250 N. Knox Ave. • Chicago 41, ILL.

Builders of 10", 11", 13", 15" Sheldon lathes, Sheldon Milling Machines, Sheldon Shapers and Sebastian Geared Head Lathes

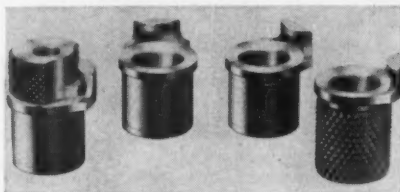
SEE US AT BOOTH #1250, ASTME SHOW, NEW YORK COLISEUM

For more data circle 502 on Postpaid Card

ASTME Tool Show . . .

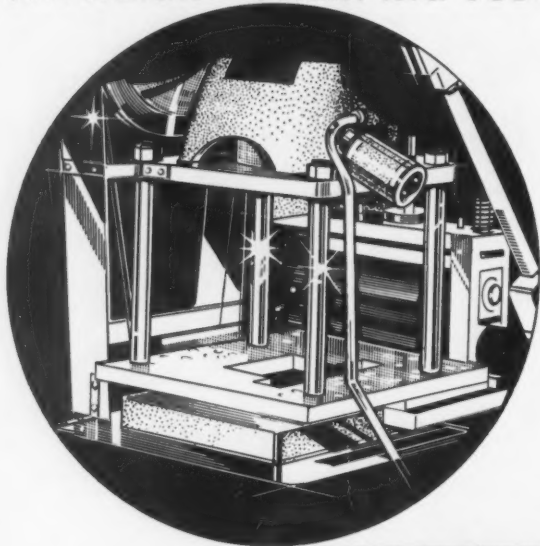
BUSHING LOCK SCREWS AND DRILL BUSHINGS

Drill bushing lock liners on display by American Drill Bushing Co., 5107 Pacific Blvd., Los Angeles 58, Calif., in Booth 2022, are said to eliminate the lock screw formerly required to



View of Un-A-Lok Drill Bushing Lock Liners to be exhibited by Ace Drill Bushing Co.

NEED A LARGE BED PRESS FOR LIGHTWEIGHT STAMPING JOBS?



The BIG H has it in hefty 5, 8, 12, and 16 ton models. They're built to stamp any lightweight material requiring a large blanking area like plastic, paper, rubber, felt and most metals.

Exclusive cylindrical ram reduces needless die wear, boosts die life by 50%. Available with extra-wide Auto-Feeds too.

Prices and more details on request.

HAVIR MANUFACTURING CO.

434 Cleveland Ave. • St. Paul, Minn.



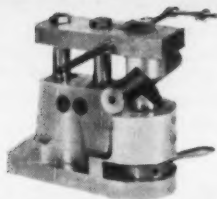
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secure slip renewable type drill bushings in place. Un-A-Lok Liners are provided with ground or unground outside diameters, or may be ordered with Delt-A-Liner o.d. for use in plastic tooling. Any easy finger-tip twist of the bushing either locks it into the liner, or removes it as desired for instant interchangeability. During drilling operations, the bushing is locked securely in the liner by rotation of the drill.

Also, a complete line of tungsten carbide drill bushings will be featured. Several types of drill bushings are available, including head and headless press fit, fixed and slip renewable.

For more data circle 93 on Postpaid Card

NEW NEW



V BUSHING ... LINERS

To self center cylindrical, square or hex stock for drilling

V for victory over a previously ticklish drilling job . . . new hardened ground Acme Industrial V bushing liners clamp over cylindrical (round bars, tubing, etc.), square or hex stocks . . . instantly, automatically locate dead center. Layout, jig boring eliminated . . . just center punch, drill and ream hole! Acting as a liner for removable bushings, Acme's "V" assures precision centered drilling always.

Available in 2 sets of 3 V bushing liners to accommodate slip bushings with O.D.'s of 3/16", 5/16" and 1/2" in a range from No. 80 drill to 11/32" in A.S.A. or Acme standard sizes. Acme V bushing liners . . . a must for every tool box.

ACME INDUSTRIAL COMPANY

200 North Laflin Street/Chicago 7, Illinois

_____ Send me complete information on new V bushing liners

_____ Send me the complete Acme Industrial bushings catalog

Name _____

Firm _____

Address _____

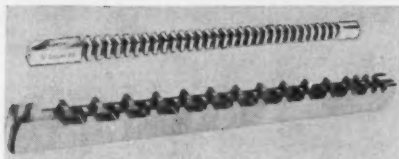
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ASTME Tool Show . . .

BROACHES

In Booth 3215, The duMont Corp., Greenfield, Mass., will exhibit two new square broaches, $\frac{7}{8}$ and 1 inch, which extend the standard sizes available to nineteen ranging from $\frac{1}{8}$ to 1-inch square. These broaches are used in an arbor press to finish a square hole to



"Minute Man" Square and Keyway Broaches

exact size in a drilled, reamed or cast bore in one pass. The company will

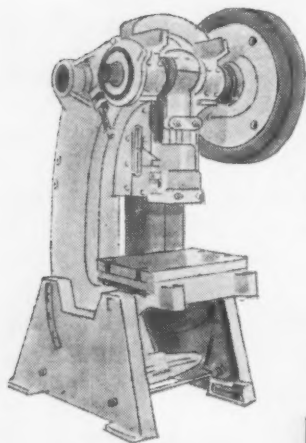
also exhibit two new high speed broaches for cutting keyways by hand in an arbor press. The new sizes— $\frac{7}{8}$ and 1 inch—extend the standard sizes available to nineteen from $\frac{1}{16}$ to 1 inch.

For more data circle 94 on Postpaid Card

*Federal's dependability assures
lower production costs—
longer press life!*



7 TO 125-TON CAPACITY



QUALITY FEATURES

- Meehanite Cast Frames
- Replaceable Bronze Bushings
- Magnaflex Inspection
- Front-operated Recline
- Oversized Crankshaft Bearings
- Longer Rams and V-ways
- Non-repeat Clutch Mechanism
- Timken Roller Bearing Flywheels

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PRESSES

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THE FEDERAL PRESS COMPANY

Dept. 904, Elkhart, Indiana

For more data circle 505 on Postpaid Card

★ m m s ★

MARKING EQUIPMENT

Feature of the exhibit, of the Noble & Westbrook Manufacturing Co., 25 Westbrook St., East Hartford 8, Conn., in Booth 3130, will be a new general purpose marking machine that contains all the operating mechanism in a compact Duomatic head. Prototypes were first developed in bench models and proved extremely efficient under long usage.

According to Noblewest, the Model 574 represents a new departure in applying all-pneumatic operation to general purpose marking machines.

The Duomatic head is comparable to an air or hydraulic press and supplies both the marking pressure and horizontal die slide travel for roll marking. Air pressure controls depth of mark and insures uniformity of impression depth in each marked piece regardless of variations in thickness.

Noblewest will also exhibit other items in its full line of precision metal marking machines and tools that include: rapid production roll marking machines, precision graduating machines, mechanical and pneumatic marking presses, bench

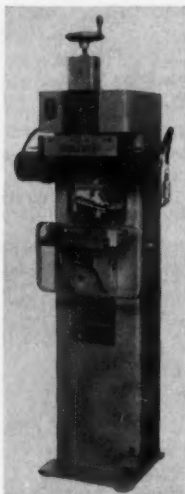
roll marking machines, hand marking tools, automatic numbering heads and precision marking dies.

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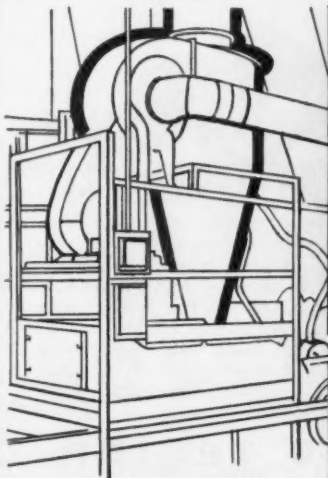
★ modern machine shop ★

MULTI-PURPOSE MEASURING MICROSCOPE

In Booth 2201, Opto-Metric Tools, Inc., 137 M M Varick St., New York 13, N. Y., will feature a multi-purpose



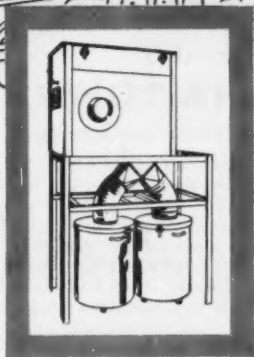
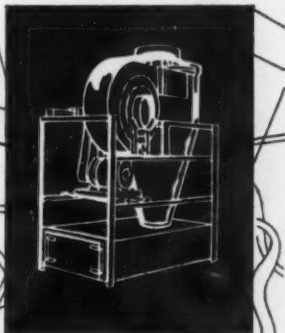
Model No. 574
Marking Machine




Custom dust collection —with a standard unit . . .

Regardless of your dust collection problem, chances are there is a space-saving Dustkop model to fit the job. Aget, for years, has led the field in efficient, compact design and has developed more than 50 standard Dustkop collectors. Each is job-tailored to most grinding, buffing or finishing operations—as well as many other types of service. Write for illustrated brochure that helps select your tailored Dustkop unit.

Also a complete line of mist collectors



AGET MANUFACTURING COMPANY DUSTKOP
1300 EAST CHURCH ST., ADRIAN, MICHIGAN Stops Dust 

For more data circle 506 on Postpaid Card

ASTME Tool Show . . .

microscope, the Optotron, which combines a coordinate measuring, a tool-maker and a metallurgical microscope in one compact and low priced instrument. It is equipped with interchangeable Leitz Optics throughout, including a triple nosepiece for 30, 100 and 400x magnification, but these may be varied to suit individual requirements. Low-voltage substage and vertical

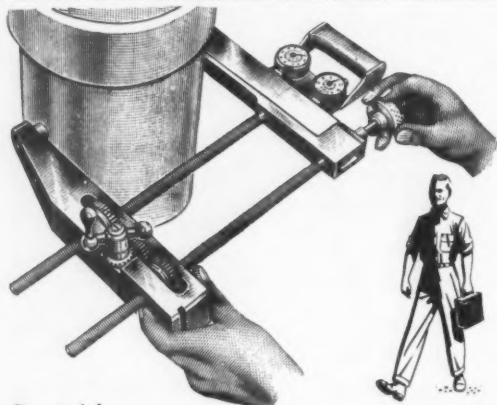
illuminators are standard equipment. The measuring stage runs on balls and has a range of 1 by 1 inch by direct reading micrometers in 0.0001 inch. Coarse and fine focusing is, of course, available, as is dial gage for depth measurements in 0.0001 inch.

The lower power magnifications serve for measurements in transmitted or reflected light, while the high power magnifications permit the examination of metallographic specimens.

Opto-Metric Tools will also have on

display a new model duplex optical comparator. This instrument can be used with a minimum of equipment as a single optical comparator. A variety of measuring stages, lenses and accessories will convert this instrument into a complete contour measuring projector. Where extremely precise measurements must be made, a microscope tube is also available.

For more data circle 96 on Postpaid Card



Portable

HARDNESS TESTER

gives "on the spot" Rockwell readings

Test materials, tools, or pieces in production "right there, right now!" Save the work of taking samples to the test bench, save the cost of sectioning, eliminate errors due to need for conversion of other scales to Rockwell hardness numbers. Large dial markings are in standard red and black for quick identification of Rockwell scales, A, B, C, D, E, F, G, H and K—all available as standard. Uses standard indentors, loads—no scale conversions required.

FOR A DEMONSTRATION, WRITE Dept. MM-561.

Riehle®

RIEHLE TESTING MACHINES DIVISION OF
American Machine and Metals, Inc.
EAST MOLINE, ILLINOIS

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Multi-Purpose Measuring Microscope

METAL CUTTING CARBIDES AND TOOL STEEL

Assistance in grade selection from immediately available tool steel stocks and a new series of cemented carbide metal cutting grades will be features of the exhibit of Allegheny Ludlum Steel Corp., Oliver Bldg., Dept. MS, Pittsburgh 22, Pa., in Booth 2233. Tool steel specialists will be in attendance to explain and demonstrate the use of the Steelector program—Allegheny Ludlum's system integrating grade selection and immediate availability from stocks of widely applied types and sizes of tool steel, high speed steel and hot work steel.

The new 700 Series Steelcutting Grades will be emphasized in the Carmet Cemented Carbide Division's display. Just released, after exhaustive field trials, the three premium grades are: CA-704, for exceptionally fine finish cutting and precision boring operations; CA-711, for extreme service in the general purpose category; and CA-720, for utmost toughness and resistance to thermal shocks in service.

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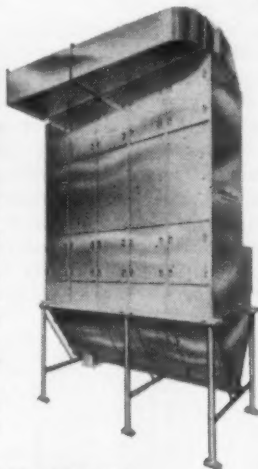
MARKING MACHINES

In Booth 2625, Apex Machine Co., 14-13 118th St., College Point 56, N. Y., will introduce for the first time two new marking machines — the Model OC-2 two-color high speed ink press for cylindrical objects and the Model EA-10 air operated hot stamped for flat items. In addition the company will exhibit automatic, semi-automatic and hand operated machines.

For more data circle 98 on Postpaid Card

NEW TORIT DUST COLLECTOR IS AUTOMATIC!

Save real dollars with the benefits from this automatic dust collector. No more interruptions on production lines! Maintenance problems are practically eliminated. This all new continuously cycling TORIT dust collector automatically cleans your air and automatically shakes its own filters and blows them clean with reverse air flow. Collected material is emptied automatically.



OTHER EXCLUSIVE TORIT BENEFITS

- automatic filter-shaker mechanism is simple, maintenance-free
- different dusts may be collected separately
- highest air-to-cloth ratios (from 5 to 25:1) and longer filter life
- only $\frac{1}{4}$ H.P. required for fully automatic operation
- polished $\frac{3}{4}$ " aluminum construction for minimum floor loading
- modular design—5' wide x 4'-8" long (for two sections) x 15'-6" high—saves space, lends ease and versatility to installation. Use up to 12 modular sections for each application! No limit to CFM capacity!

Write today for literature.

TORIT MANUFACTURING COMPANY

Automatic Collector Division

1133 Rankin Street, St. Paul 16, Minnesota, Dept. 735

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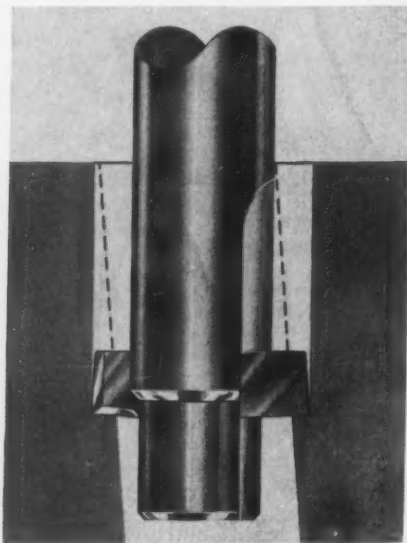
ASTME Tool Show . . .

ADJUSTABLE CUTTERS

A new line of adjustable cutters, designed to eliminate "core drift" in boring of cored holes, will be displayed by Muskegon Tool Industries, Inc., Muskegon, Mich., in Booth 1122. Known as Core-Rector Cutters, the tools provide a perfectly true hole, even though the cored hole itself deviates from the center line in the workpiece.

Core-Rector Cutters incorporate a special grind to eliminate the deflection normally encountered in machining off-center cored holes by conventional methods. Core-Rector Cutters can be used on turret lathes, bar automatics, chucking machines, boring mills, vertical turret lathes or radial drills and are available in a full range of sizes for high speed, accurate boring of virtually any cored hole.

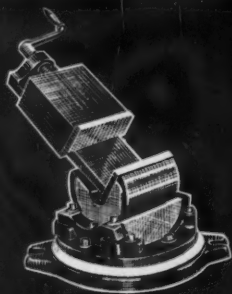
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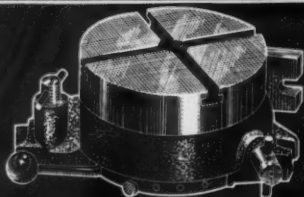
Muskegon Core-Rector Adjustable Cutter

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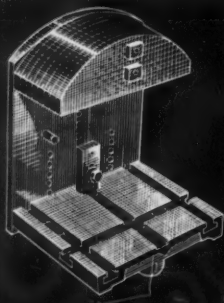
5 WAYS . . .



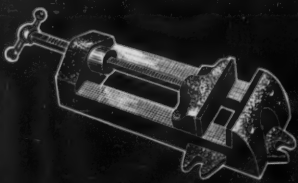
3 WAY VISES
FOR ALL ANGLE MACHINING



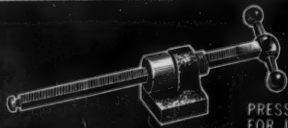
SPEEDI-SPACER
FOR FAST PRECISION INDEXING



ADJUSTABLE LATHE FIXTURES
SAVE SPECIAL TOOLING



QUICK ACTING VISES
FOR TOUGH OPERATIONS



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TO MAKE SET-UPS EASIER...QUICKER

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PL 4-2431

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Trenton EX 6-8286

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Machinists' Tools, Inc.,
Buffalo TT 4-5397
Gierston Tool Co.,
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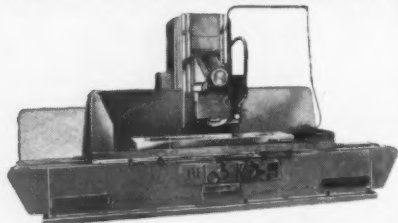
UNIVERSAL

WISE & TOOL CO.

PARMA • MICHIGAN

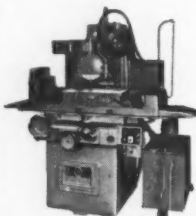
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MAXIMUM PRECISION IN TOOLROOM OR PRODUCTION GRINDING



MODEL F HYDRAULIC FEED SURFACE GRINDER a production type with cross sliding head, built in sizes ranging from 12" x 18" x 48" to 30" x 25" x 120". Heavy, powerful grinder with maximum table speed of 150' per minute. Motor mounted directly on grinding wheel spindle to assure full power is transmitted directly to wheel. Automatic feeds in increments from .0001" to .001" per reversal available.

NO. 360 HYDRAULIC FEED SURFACE GRINDER. A precision toolroom type which offers absolute accuracy with microinch finish at production speeds. One-piece column and base, infinite longitudinal table speeds from 3" to 120' per minute, variable speed cross feed. Available with new incremental downfeed with automatic spark-out after pre-set stock removal.



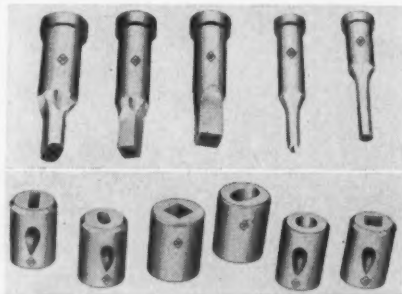
NO. 10 UNIVERSAL CUTTER AND TOOL GRINDER built to meet the need for a high grade machine of medium capacity at a moderate price. Combines rigidity with maximum convenience of operation. Head swivels 360°, locks in any setting; table swivels 90°. Hand operated longitudinal movement. Two spindle speeds.

ASTME Tool Show . . .

PIERCING PUNCHES, DIE BUTTONS AND RETAINERS

In Booth 3605, Porter Precision Products, Box 208, Cincinnati 15, Ohio, will exhibit one of the most complete lines of piercing punches, die buttons and retainers. Given prominent display will be the following items: (1) head type punches, (2) ejector type punches, (3) welded carbide tipped punches, (4) Bal-Lok Punches and Die Buttons and (5) "Kwik-Pull" Bal-Lok Retainers.

Durable Punch and Die Co., 9030 South Hermitage St., Chicago 20, Ill., a wholly-owned subsidiary of Porter, will feature a line of standard high speed steel perforators having many new features such as short nib lengths, long nib lengths and a complete new idea on standardization of wire type piercing punches. Also on exhibit will be Durable Sleeve Supports, including standard line of Durable Inter-meshing Sleeves as well as new rod



(Above) View of Porter Perforating Punches and (Below) Various Porter Die Buttons.

GRAND RAPIDS

For more data circle 510 on Postpaid Card

piercing sleeves. A totally new concept in piercing combinations will also be shown. This will feature the Durable Perforating Set which includes a perforator, punch holder, stripper guide bushing and matching die button. For more data circle 100 on Postpaid Card

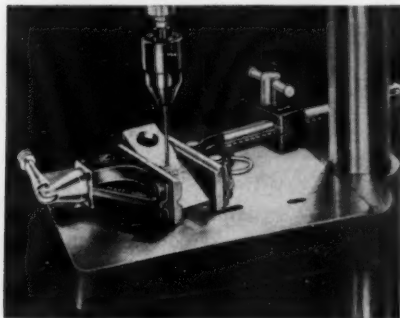
★ modern machine shop ★

CHUCKS AND VISES

Fully automatic AMF Wahlstrom Chucks, which permit tool changing in just two or three seconds, and AMF Float-Lock Drill Press Vises, which turn a drill press into a complete machine tool, will be exhibited by American Machine & Foundry Co., 224 Glenwood Ave., Bloomfield, N. J., in AMF Tool Booth 3515.

Also on display will be AMF Lowerator Controlled-Heat Work Positioners, manufactured by the Lowerator Division. These mobile, self-leveling units provide substantial economies and space savings in the handling and production of such delicate products as transistors.

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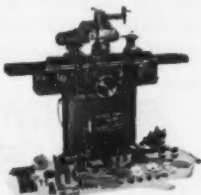


Wahlstrom Chuck and Float-Lock Vise

YOU

CAN FIND THE RIGHT MACHINE FOR YOUR NEEDS ON THESE PAGES

NO. 60 UNIVERSAL CUTTER AND TOOL GRINDER offers precision sharpening, fast set-ups and low maintenance. Designed for maximum convenience of operation, with work weight carried directly over base, permitting operator to stand close to work. Master hand wheel provides three speeds of longitudinal table travel.



NO. 20 HAND FEED SURFACE GRINDER has hand wheels for vertical and longitudinal table movement to assure toolroom precision and exceptionally fine finish. One-piece column and base, greased-for-life ball bearing spindle. Available with portable, motor driven coolant system.

NO. 1230 HYDRAULIC FEED O. D. & I. D. GRINDER meets the needs of users requiring a machine that does both internal and cylindrical grinding. It is a rugged, precision tool capable of taking rough cuts as well as producing the finest finish. Has a host of controls and adjustments for maximum convenience and versatility of operation.



A note on your letterhead will bring full details. Please specify the type of grinder you are most interested in.

GALLMEYER & LIVINGSTON CO.
408 Straight Ave., S. W., Grand Rapids, Mich.

GRINDERS



For more data circle 511 on Postpaid Card

ASTME Tool Show . . .

AJR-COLET CHUCK AND CHUCKING SYSTEM

The Dunham Tool Co., Inc., New Fairfield, Conn., in Booth 2610 will display its air-collet chuck, which converts any machine tool to 5C size. The chuck includes a self-contained air-actuated collet adapter, which is designed for secondary chucking, not for

through work. The chuck accommodates all 5C collets, including Dunham Expanding Collets for i.d. holding from 3/16 inch to 6 inch diameters. Truing screws permit adjusting to 0.0005 inch t.i.r. Internal stops eliminate length changes due to draw back. Foot valve frees hands for efficient part handling. Special rotary union permits spindle speeds to 3,000 revolutions per minute.

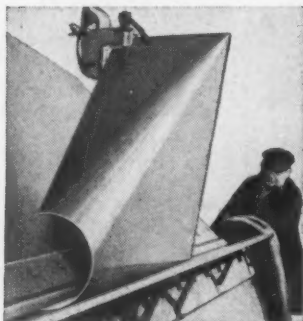
The company will also display a

missile vacuum chucking system for holding missile and aircraft components such as ceramic nose cones and stainless parts up to 10 inches in diameter. Activated by a vacuum pump with hold down pressure of 12 p.s.i. the chuck develops over 33,000 lb. of distortion-free hold down pressure on a 60 inch diameter part. An automatic safety device is incorporated to prevent loss of vacuum in case of power failure. Special designs permit

Bending Steel Plates for WELDMENTS?

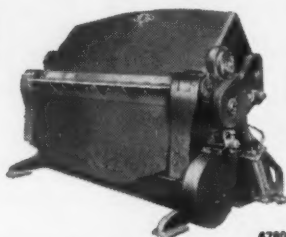
do it economically with

CHICAGO® BENDING BRAKE



Many standard sizes are available with capacities for bending mild steel up to 12 feet by ¼ inch or 16 feet by ½ inch.

The elimination of die costs and the ease of changing from one job to another make the CHICAGO bending brake the economical method for bending steel plates for weldments. An automatic stop regulating the degree of bend assures duplication on successive pieces.



For details on how to do it, ask for Bulletin P-55



Press Brakes • Straight-Side-Type Presses • Press Brake Dies
Hand and Power Bending Brakes • Special Metal-Forming Machines

**DREIS & KRUMP
MANUFACTURING CO.**

7418 South Loomis Boulevard, Chicago 36, Illinois
For more data circle 512 on Postpaid Card



"Air-Collet" Chuck

boring i.d., facing and turning o.d. concentric within 0.001 inch on parts up to 100 inches in diameter. Also, forgings and sand castings can be chucked with equal facility.

For more data circle 102 on Postpaid Card

★ modern machine shop ★

MACHINE HANDLES AND HAND KNOBS

In Booth 3237, Balcrank Inc., Machine Tool Div., 18 Disney St., Cincinnati 9, Ohio, will introduce two machine tool accessory products — conical-shaped steel machine handles and small diameter quick turning steel hand knobs. The conical-shaped handles, both revolving and solid, are available in three sizes, with overall lengths from 3 1/16 inches to 4 11/16 inches. All three sizes of machine handles have been standardized with a 7/16-inch diameter shank for press fitting.

The small diameter hand knobs, known as the "Fastrol", are machined from solid bar steel for the maximum strength and durability. These handles are available in five sizes, ranging from 1 inch to 3 inches



Balcrank Machine Handle and Hand Knob

in diameter, complete with or without handle for maximum ease in turning the knob.

For more data circle 103 on Postpaid Card

NEW INFORMATION for every tool and diemaker!

The new edition of **TOOL STEEL SIMPLIFIED** gives you proved job-help found in no other book!

- Put your toolroom on a profitable, competitive basis
- Reduce heat treating failures
- Improve tool and die performance
- Lower diemaking costs
- Take the guess-work from tool steel selection
- Double check your tooling procedures
- Train new men faster
- Get more consistent results
- Advance faster in your job

ORDER NOW!



23 chapters
596 pages
349 illustrations

PRICE ONLY \$2.50

(Postpaid in U.S.A. Elsewhere \$3)

The Carpenter Steel Company, Reading, Pa. Dept. 3

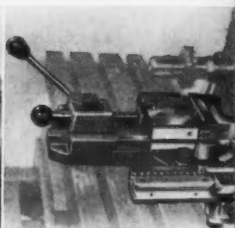
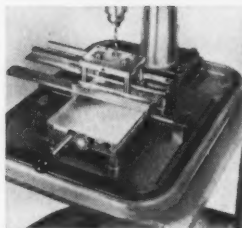
Please send the NEW Tool Steel Simplified at low price of \$2.50.
Check or money order enclosed.

Name _____ Title _____
Company _____
Address _____
City _____ Zone _____ State _____
(please print)

For more data circle 513 on Postpaid Card

GANG VISES AND GANG FIXTURES

Lassy Tool Co., Plainville, Conn., will display its complete line of gang vises and gang fixtures in Booth 1724. The vise has a new compensation jaw assembly that assures even powerful pressure on a multiple number of



(Left) View of Slide Lox Tool and (Right) Gang Vise for Milling and Grinding

Free Technical Bulletin on Surface Measurement

gives all the meat of ASA Standard B46.1-1955 on surface roughness, waviness and lay, plus helpful supplementary material. Arranged for easy reading and convenient reference. Includes these sections:

- Basic definitions—with profile records of typical surfaces.
- How to designate the characteristics of roughness, waviness and lay, on drawings.
- How to measure those characteristics.
- Arithmetical and r.m.s. average roughness height.
- How the Profilometer® measures average roughness height.
- Instrument characteristics for roughness measurement—as specified by the standard, and as provided by the Profilometer.

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**MICROMETRICAL
MANUFACTURING COMPANY**

A SUBSIDIARY OF THE BENDIX CORPORATION

3621 S. STATE RD., ANN ARBOR 7, MICHIGAN

For more data circle 514 on Postpaid Card

pieces even though they vary in size. Its springless clamping employs a number of compensating cams that deliver direct, positive line pressure unlimited. A feature that makes this tool very adaptable to a wide range of uses is that the work compensating jaws can be easily removed and ground to hold special shapes or be replaced with other jaws fitted for special jobs.

The Lassy Slide Lox also to be exhibited, is said to provide the ideal solution to holding work on drill presses and tapping machines without time consuming clamping. Slide Lox gives complete freedom of motion in any direction, while at the same time

is always securely locked against turning and lifting. The operator slides the tool to the desired location, using the handle for this purpose, drills at maximum speed with complete safety from whirling tools and chips.

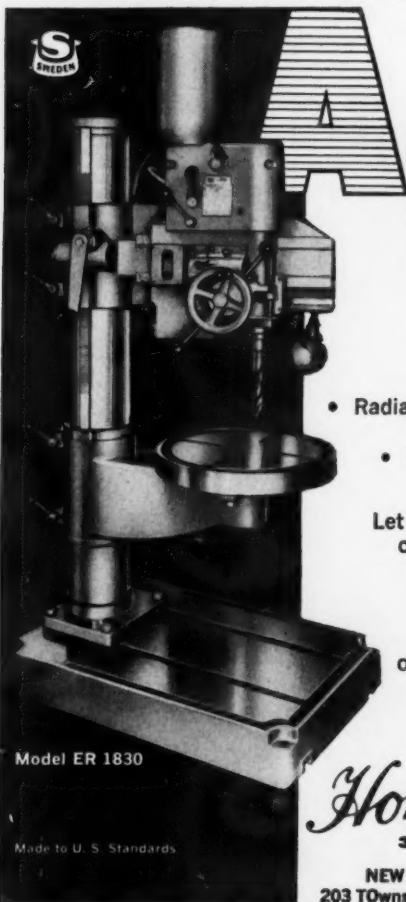
This tool eliminates the need for slots and tapped holes in the table that fill with chips and impede free movement. The Slide Lox fixture is ideal as a base for drill jigs both permanent or attached.

For more data circle 104 on Postpaid Card

PACKAGING MATERIALS

In Booth 3811 Jiffy Manufacturing Co., 360 Florence Ave., Hillside, N. J., will show a broad line of cushioned packaging materials, including the newly improved Jiffy Shipping Bag with the tear tape opening device, and the full line of Kushion Kraft Cellulosic Wadding, including the Type III product as prescribed by Federal Specification PPP-C-843.

For more data circle 105 on Postpaid Card



only

ARBOGA RADIAL DRILL PRESSES

have the exclusive Drill Ejector

Shown here is just one model of the complete Arboga line.

- Radial Drill: 24½" • Capacity in steel: 1½"
- 8 speeds, 80-890 r.p.m. • Feeds: 2
- Exclusive Drill Ejector; 7⅛" dia. Column

Seeing is believing!

Let any one of the 100 dealers across the country show and demonstrate for you this and other Arboga drill presses.

Over 100,000 are in use now, many completing a quarter of a century of trouble free service. Call any one of the numbers below or ask us for the name of your nearest Arboga dealer.

Illustrated brochure on request.

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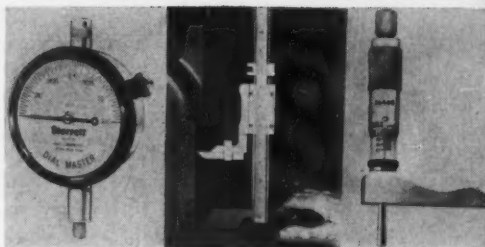
May, 1961

MODERN MACHINE SHOP 235

ASTME Tool Show ...

MEASURING TOOLS

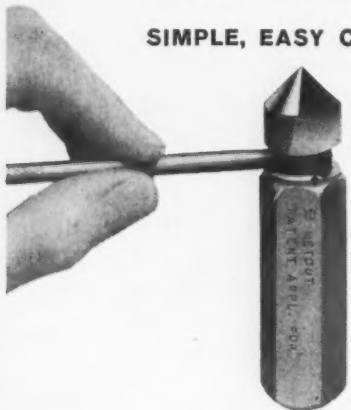
The L. S. Starrett Co., Dept. D, Athol, Mass., will exhibit many new tools at Booth 1214. These new tools are important additions to the complete line of Starrett mechanics hand measuring tools and precision instruments, steel tapes, steel rules, dial indicators, dial gages, hacksaws, hole saws, band saws, band knives and



(Left) Starrett Dial-Master, (Center) No. 255 Height Gage, (Right) No. 443 Depth Gage.

NEW! METCUT Single Flute Countersinks

SIMPLE, EASY CAM-SHARPENING!

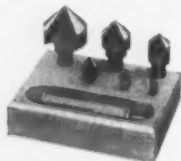


Metcut sharpening system eliminates errors, expensive set-ups • extends life of cutters • assures accuracy throughout tool life • one fixture for complete size range to 1½"

Patent Applied For

Here's a single flute cutter for deburring, chamfering or countersinking which you can resharpen with little effort and expense, always maintaining original tool accuracy.

Long tool life and chatter-free cutting with fine finishes are assured. Simple fixture has cam-clearance built-in and transfers correct form to cutters when properly positioned on any conventional grinder or cutter sharpener. No other tooling required.



**COMPLETE SET 6 CUTTERS*
INCLUDING SHARPENING FIXTURE**

Sizes ¼", ⅜", ½", ¾", 1", 1½"

Specify included angle of 60°, 82° or 90°.

* Individual cutter sizes may be ordered separately

\$37⁵⁰

Send for complete description and data sheet

METAL CUTTING TOOLS, Inc., Rockford, Illinois
For more data circle 516 on Postpaid Card

precision die and flat stock.

Among the important new tools is a series of master vernier height gages, combining correct balance and weight for easy handling in applications where a lighter weight gage is preferred.

Also displayed will be a new series of micrometer depth gages, featuring a short half base designed to facilitate measuring depths of holes and slots located close to shoulders or between obstructions where full base gages will not go.

Also shown will be three new super precision dial indicators, including Starrett Dial-Master No. 25-106 with an accuracy of plus or minus 0.00001

inch. These indicators are designed for applications requiring extreme precision, such as laboratory work or shop inspection to laboratory standards.

Other tools to be shown are: disc type micrometers for measuring thicknesses in close quarters; blade type micrometers for measuring depths or diameters in narrow grooves or slots; and micrometer heads designed for mounting on electronic equipment, machine tools, fixtures, special gages and a variety of other applications where micrometer accuracy in setting and reading is required.

For more data circle 106 on Postpaid Card

★ m m s ★

MACHINABLE CARBIDES

Ferro-Tic, a steel - bonded carbide will be featured by Chromalloy Corp., Sintercast Div., 169 Western Highway, West Nyack, N. Y., in Booth 3901.

Tools and various components, highly resistant to temperature, corrosion, and wear may be fabricated from this material, using conventional type machine tools.

The machinable blanks of

cemented carbide are produced by powder metallurgy techniques. Crystals of titanium carbide are embedded in a relatively soft matrix of stainless or tool steel, then sintered. The blank, according to the manufacturer, retains the desirable properties of both of its constituents; namely, titanium carbide's ultra-hardness and steel's machinability.

For more data circle 107 on Postpaid Card

MARSHALL Scribe-IT[®]

MARSHALL'S TIME SAVING COMBINATION
in the most popular sizes of:



OILcrat
GROUND FLAT STOCK

Over-size specifications:
Under 3/16" thickness,
Pre-colored not oversize
3/16" and over, Thickness
plus .011" to .013"
Width plus .010" to .015".

Your Marshall distributor stocks
OILcrat
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Sold through selected distributors



WRITE FOR CATALOG OR FREE WALL CHART

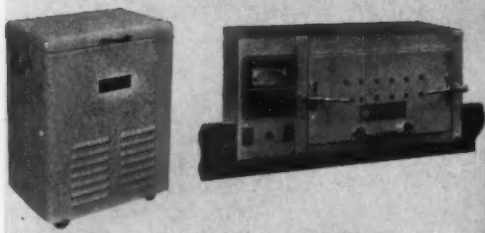


For more data circle 517 on Postpaid Card

ASTME Tool Show . . .

ENVIRONMENTAL AND THERMAL SHOCK CHAMBERS

In Booth 2002, Cincinnati Sub Zero Products, Dept. S-1, 3930 Reading Rd., Cincinnati 29, Ohio, will show a 0.5 cu. ft. environmental chamber that is said to be ideal for R/D testing, moderate job shop applications, and expansion fit assembly. Whether used



(Left) Penguin/5 Environmental Chamber
(Right) Ultratemp Thermal Shock Chamber.



FOR SALE!

ONE 2" BORE x 4" STROKE
DOUBLE ACTING CYLINDER

List Price **\$2770**

- BRAND NEW! • NEVER USED!
- PACKED IN ORIGINAL CARTON!



- Ground & Polished St. St. Rod. • Nylined Bearing.
- Honed Brass Barrel Copper-brited for resistance to corrosion.

Parts drawing will be furnished at no charge. We don't anticipate that Replacement Parts will be required . . . but if some ever are, the parts will be available from stock.

For 150,000 other such
bargains write for
CATALOG No. 90
before next Tuesday!



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MMS-5

Name

Company

Address

City.....Zone.....State.....

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for transistor testing, miniature bearing manufacture, or numerous other uses, the Penguin/5 is practical where space is at a premium. This versatile chilling machine occupies less than two and one half sq. ft. of floor space, and it is caster mounted for ease of portability. Standard low temperature range is from minus 10 to minus 60 deg. F.; it is available with a high range to 500 deg. F. The chamber is 15 inches long, 9 inches wide and 8 inches deep, and is completely surrounded by 2½ inches of low "K" factor insulation.

Cincinnati Sub-Zero will also show a new line of thermal shock chambers. Espe-

cially designed for bench-top operation, the Ultratemp/600 and Ultratemp/800 are said to be ideal for all R/D applications. The new-line, basic model, has a net work area of one half cubic foot. Completely removable, file-drawer type door, gives access to the steel chamber which measures 16 inches long, 8 inches wide, and 8

inches high. Model 600 is designed and instrumented for operation between minus 100 deg. F. and plus 500 deg. F. Ultratemp/800 has a low temperature of minus 320 deg. F. and a high of plus 500 deg. F. Each is instrumented to an accuracy of plus or minus 1/2 deg. F.

For more data circle 108 on Postpaid Card

for repeat diameters
within .001" and
greater production...

HYDRAULIC TRACER LATHE at the price of an attachment!



complete price

\$2,950

MYFORD
MACHINE TOOLS

THE MYFORD MINI-KOP

Highest accuracy is assured by . . .

- Forged spindle mounted in precision angular contact bearings.
- Speeds up to 4875 RPM.
- Direct spindle drive from 2 HP motor.
- All bearing surfaces hardened & ground.
- Will reproduce profiles within .001" dia.
- Automatic length stop accurate to .001".

Greater flexibility, rapid production through

- Alternate reproducer approach angle.
- Sensitivity to very slight tapers.
- Uses flat or cylindrical templates.
- Fast traverse in either direction.
- Finger-tip control of hydraulic carriage-motion, giving instantaneous variable feed.
- Best suited for components of approx. 1 1/4" profile.

Write for the name of our nearest distributor
and detailed bulletin No. MM-2.

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SEE US AT THE ASTME SHOW, BOOTH 2117

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ASTME Tool Show . . .

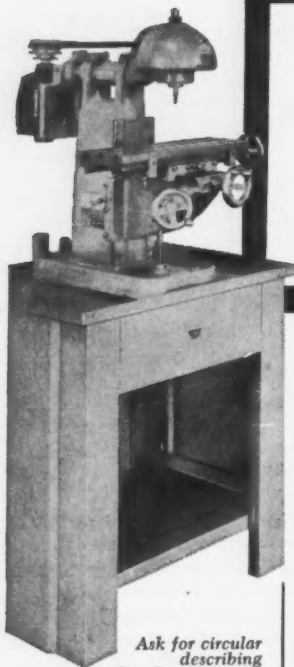
AIR POWERED METAL CUTTING SHEARS, MOTORS AND ROUTERS

In Booth 3830, The Stanley Works, Stanley Power Tools Div., 195 Lake St., New Britain, Conn., will introduce a line of "Unishear" air metal cutting

shears and air powered motors and routers, for both standard and specialized high speed production work. Air powered motors cannot burn out or be damaged by sudden shocks or stops and are, therefore, indifferent to overloading and stalling, it is claimed. Less weight, less bulk per horsepower means easier handling, less fatigue, greater accessibility to confined work areas. Controlled speed and optimum efficiency are obtained because air

pressure can be regulated to control speed.

Air routers and motors are designed for speed under load which provides uniform, steady work and means less expensive bit breakage. Absence of "free-wheeling" means no work damage and greater operator safety. Pre-loaded matched bearings prevent



Ask for circular describing Benchmaster mills and numerous accessories!

Benchmaster Manufacturing Co.
1835 W. Rosecrans Avenue,
Gardena, Calif.

benchmaster
the preferred
mill
for small jobs!

**4 models: vertical,
horizontal, two
production types.**

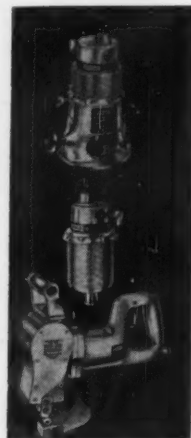
Benchmaster is popular in every shop because it's a *real* time and money saver . . . takes *big, heavy cuts* for rapid metal removal, mills *vertically or horizontally* simply by substituting spindle assemblies, is *fast and easy* on set-ups, *saves thousands of dollars* over big-mill investments!

For small jobs you just can't beat a Benchmaster . . . low initial cost, high precision, power and extreme versatility make this the best dollar investment in your shop!

benchmaster

World's largest
manufacturer of small punch
presses and mills.

For more data circle 520 on Postpaid Card



Stanley Router, Motor and "Unishear"

end play at the bit and micrometer depth adjustment for precision accuracy allows setting of the bit in a matter of seconds.

Precision ground, solid carbide bits for maximum protection and long tool life are also available from Stanley. They are designed to cut faster, allow higher speeds, stay sharp longer, hold their edges in exceptional heat and can be worked more efficiently in many of the new and extremely tough abrasive types of materials.

"Unishear" air metal cutting shear, 12 gauge, has an air trigger throttle to control or vary speed. It has automatic start-stop lubrication from an oil reservoir in the handle and is designed to cut at speeds up to 12 feet per minute.

For more data circle 109 on Postpaid Card

★ m m s ★

PRECISION SURFACE EQUIPMENT

The latest type semi-steel, granite, magnesium and aluminum precision surface equipment for precision layout, tooling manufacturing and inspection will be

featured in Booth 2605 by The Challenge Machinery Co., Grand Haven, Michigan.

Shown for the very first time will be a reversible black granite surface plate. Also on display will be a variety of types of surface plate equipment and many types of smaller surface plate equipment, including a variety of angle plates, box parallels and vee blocks. For more data circle 110 on Postpaid Card



STATIONARY OR PORTABLE MODELS

Dozens of uses for these sturdy steel tool stands—in toolrooms, stockrooms, on assembly lines.

Interchangeable trays attach at each corner with four bolts.

Available with glide feet or swivel type casters.

Drawers have padlock attachment and sliding tool tray. Drawers operate on ball bearing rollers. Finish, gray baked-on enamel.

Write for free 100-Page Lyon Catalog.

LYON METAL PRODUCTS, INC.

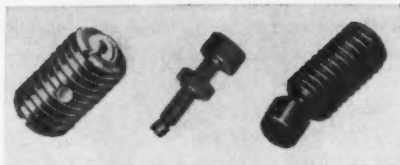
General Offices: 113 Monroe Ave., Aurora, Illinois
Factories in Aurora, Ill.—York, Pa.—Los Angeles
Dealers and Branches in All Principal Cities

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ASTME Tool Show ...

PLUNGERS, CLAMPS AND HOLDING TOOLS

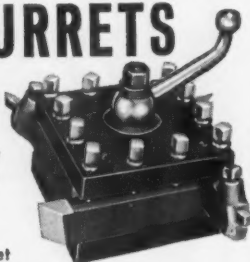
Vlier Engineering Corp., 8900 Santa Monica Blvd., Los Angeles 46, Calif., in Booth 2122, will feature the Vlier Ball Plunger which is a compact, spring-loaded ball widely used in in-



(Left to Right) Vlier Stainless Steel Ball Plunger, Torque Thumb Screw Swivel Pad Clamp and Socket Set Swivel Pad Clamp

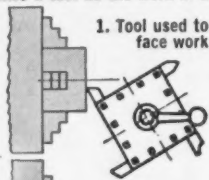
Enco TOOL POST TURRETS +.0005"

**Re-Indexing Accuracy
Guaranteed!**

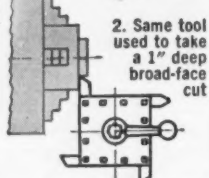


Put an Enco Turret on your lathe and get the accuracy, speed, and cost-cutting advantages that make Enco Turrets first choice of leading lathe builders. Get 12 station indexing—30°, 60°, and 90° from each of 4 tools... get smooth, effortless hand indexing... and capitalize on the advantages of Enco's exclusive, patented "O" Ring Seal that keeps indexing mechanism free of chips and dirt. There's an Enco Turret made to fit your lathe.

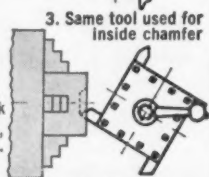
Makes 1 tool do the work of 3



1. Tool used to face work



2. Same tool used to take a 1" deep broad-face cut



3. Same tool used for inside chamfer

TOOL SIZE	TOOL BLOCK SPECIFICATIONS	PRICES F.O.B. CHICAGO
(STANDARD)		
1/4"- 3/8"	2 1/2" sq. x 1 1/4" thick	\$ 37.00
3/8"- 1/2"	3 1/2" sq. x 1 3/4" thick	\$ 58.00
5/8"- 7/8"	3 1/2" sq. x 2 3/16" thick	\$ 72.00
5/8"- 3/4"	4 1/2" sq. x 2 1/4" thick	\$ 78.00
3/4"-1"	4 1/2" sq. x 2 3/4" thick	\$ 97.00
7/8"-1 1/4"	6" sq. x 3 3/16" thick	\$165.00
(HEAVY-DUTY)		
3/4"-1"	4 1/2" sq. x 3" thick	\$148.00
1" -1 1/2"	6 1/2" sq. x 3 3/4" thick	\$215.00
1 1/4"-1 3/4"	7" sq. x 4 1/4" thick	\$255.00
1 1/2"-2"	7 1/2" sq. x 4 3/4" thick	\$295.00

Machinable Base T-Slot Turrets carried in stock
To order Turret fitted to your lathe, send T-Slot, center height dimensions, and maximum tool size. No charge for fitting. Fast Delivery.

Enco MANUFACTURING CO.
Write for catalog #53 and name of nearest dealer
Dept. # 151 4520 W. Fullerton Ave., Chicago 39, Ill.

SEE US AT BOOTH 3834, ASTME SHOW, NEW YORK COLISEUM
For more data circle 522 on Postpaid Card

dexing automatic feed drives, for gear shifters, as locators in progressive dies, in torque limiting clutches, for positioning levers in gages and so on, anywhere a controlled end pressure is required.

The company will also display Vlier Model SC-324, Socket Set Swivel Pad Clamps, which feature a unique ball-joint pad construction that provides extremely smooth angle adjustment and rotation of pad. The pad swivels 7 1/2 degrees each side of the center line in all directions to accommodate off-angle surfaces. The flat pad face assures tighter clamping.

Also to be shown is the torque thumb screw swivel pad clamp, which is a

combination of the Vlier Torque Thumb Screw, a holding tool which applies a controlled end pressure, and the Vlier Swivel Pad Clamp, which permits a part to be securely held without marring its surface.

For more data circle 111 on Postpaid Card

★ modern machine shop ★

HIGH SPEED AND TOOL STEELS

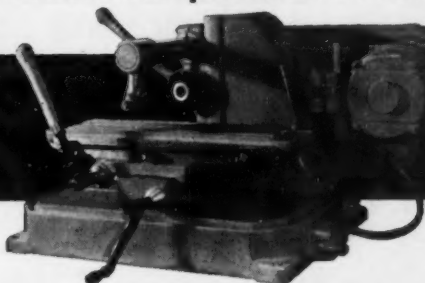
Crucible Steel Co. of America, Four Gateway Center, Pittsburgh 22, Pa., will exhibit in Booth 1603 four new developments created by its research and development section. Rex 49 is a new high speed steel which may be heat treated to 68 Rc. It has been developed to provide greater cutting economies and efficiency for difficult-to-machine materials. The uniform higher hardenability of Crucible CSM 2 with samples cut from the middle of an eight foot bar approximately 20 by 10 by 1/2 inch will be on display to show the following improved characteristics: higher hardness in the center; smooth machining characteristics; more uniform polish and greater resistance to wash.

The company has developed a Densifying Process to improve the center soundness of large bars of tool steels. A cross section measuring 25 by 14 by 1/2 inch cut from the middle of an eight foot bar will be on display in the booth.

A 24 inch square vacuum arc, remelt sample of Crucible 218 (H-11) tool steel, will also be on display to show the improved characteristics available in this product.

For more data circle 112 on Postpaid Card

Standard
"Building Block" Assemblies
combine to form
economical production millers



U★S★Half Mill®

Select the most productive combination of milling head, slide, table, drive, and mount.

Interchangeable Half Mill components build complete highly productive single column or Duplex Milling Machines. SEND FOR DETAILS

U★S★Burke MACHINE TOOL COMPANY

Builders of Milling Machines Exclusively

3 BROTHERTON ROAD, CINCINNATI 27, OHIO

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ASTME Tool Show . . .

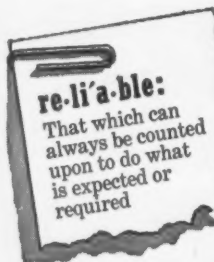
DRILLING HEADS AND TAPPING HEADS

In Booth 3202 Ettco Tool & Machine Co., Inc., Brooklyn 37, N. Y., will display a lead screw tapping head that fits any drill press, but uses it for power only. The unit, identified as the Model No. 2 LS "Auto-Tap," has an

actuating lever, stop and depth control as integral parts of its design. The lead screw carries the thrust while the tap only cuts the thread, according to the company. With the "Auto-Tap," even unskilled operators can produce precision tapped holes. Production rates can be stepped up, at the same time that tap breakage and work spoilage are reduced as a result of the "Auto-Tap" design and operating advantages, the manufacturer claims.

Featured in the unit is a hardened, precision-ground lead screw, with pitch matched to that of the tap being used, that overcomes initial starting torque. Longer life is assured for even small diameter taps and there is no chance of stripped, pulled or faulty threads caused by downward or upward pressure by the operator.

A complete line of "Auto-Tap"



CRATEX RUBBERIZED ABRASIVES

*Micro-deburring, Smoothing,
Cleaning, Polishing*

Cratex reliability lowers costs

You can count on every Cratex item to perform just as you expect it to—exactly as the last one did and as the next one will. This is the key to efficiency in micro-deburring, smoothing, cleaning and polishing. YOU SAVE TIME because you know just what to expect in performance without experimenting or compensating. YOU SAVE REJECTS because with Cratex no unexpected irregularities occur to spoil work pieces.

WHEELS • POINTS • BLOCKS • STICKS • CONES
in 4 grit textures for power or manual
application. Sold through leading industrial
supply distributors.

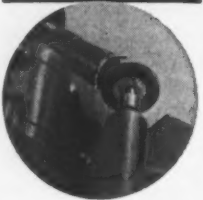
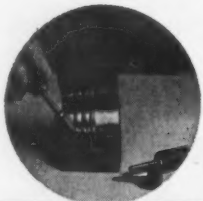
FREE! Send for the complete CRATEX
Industrial Catalog today

CRATEX

MANUFACTURING COMPANY, INC.

1600 Rollins Road

Burlingame, California



View of Model No. 2
LS "Auto-Tap" Lead
Screw Tapping Head

For more data circle 524 on Postpaid Card

lead screw tapping attachments will also be displayed. The unit, a support arm attachment which fastens to round column drill presses, can be used with any reversing type head to convert the drill press into a precision tapping machine. It enables operators even with no special skills to precision tap holes on piece after piece, without danger of thread damage.

Also in the exhibit will be Ettco's

Model 400 Knuckle-Head, a fully adjustable four spindle drilling and tapping head, it meets the demand for a compact, lightweight unit to perform small delicate production operations. Small and easy to handle it eliminates the need for using larger more expensive and cumbersome adjustable heads for most smaller jobs. The head is designed to operate in any position on any drill press, drilling or tapping unit

Easy Operation, Precision Measurements ...with Wilson "Rockwell" Hardness Testers

No matter what your hardness testing requirements are, there's a Wilson Rockwell instrument to do the job easily and accurately. Wilson instruments on the production line and in the laboratory offer these advantages:

Accuracy—Precision-built, with exact calibration, for consistently correct results.

Easy operation—Even an unskilled operator can get perfect readings. All controls conveniently grouped.

Long life—Simple design, rugged construction make Wilson instruments as durable as a machine tool.

Easy maintenance—Interchangeable mechanisms, with spindles mounted in oil-less bearings.

Complete line—Choose from the widest variety of instruments available, including semi and fully automatic models and Wilson "Brale" diamond penetrators.

Write for details—Ask for Catalog RT-60. It gives complete information on the full line of Wilson Rockwell hardness testers and accessories.



WILSON "ROCKWELL" HARDNESS TESTERS

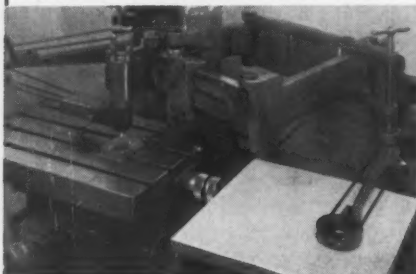
Wilson Mechanical Instrument Division
American Chain & Cable Company, Inc.

230-G Park Avenue, New York 17, New York

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KUHLMANN PANTO-MILLERS



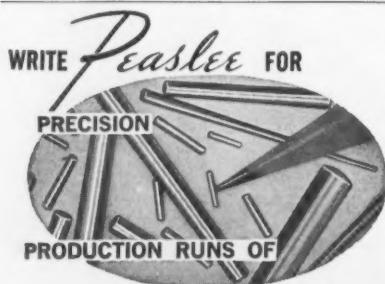
will produce cams, dies, etc., of intricate contour direct from drawings. Highest accuracy.

Demonstrated at ASTME Tool Exposition, Booth No. 3938, May 22-May 26, 1961, New York Coliseum.

ANTARES INSTRUMENTS INC.

55-02 37th Ave., Woodside 77, N. Y.

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TAPER PINS

DIA. 9/0 to #4

As specialists in stainless-steel, instrument-type pins, we offer quantity runs of standard size Taper Pins. Tolerances are held to .001 on dia. Sizes run from #4 down to 9/0. Send your blueprints for prompt quotation.

THE PEASLEE METAL PRODUCTS INC.

468 Tolland St. • East Hartford 8, Conn.
For more data circle 527 on Postpaid Card

246 MODERN MACHINE SHOP

ASTME Tool Show . . .

or machine. It will either drill or tap from two to four holes ranging from 1/32 to 1/4 inch in steel.

In addition, the company will exhibit the Model 1100 "Knuckle-Head," which can be operated with from two to eleven spindles, converts any single spindle drill press into a high-production multi-hole operation. It is more flexible and offers a larger work area than previously possible.

For more data circle 113 on Postpaid Card

★ modern machine shop ★

BALANCERS

The Industrial Balancer Department, Stewart-Warner Corp., Dept. YY100, 1850 Diversey Parkway, Chicago 14, Ill., will display its cradle type Model 704 balancer, vibration monitor Model 2395 balancer, port-



View of Model 2409 Vertical Balancer

May, 1961

able Model 2390 balancer and Model 2409 vertical balancer in Booth 3917. The vertical balancer has four potentiometers which permit four separate calibrations of the meter. Thus the calibration for a production run of one size of pulley, for example, could be "saved," and another pulley balanced on the same machine without upsetting the first calibration. Conceivably, in production work, three calibrations would be saved, with the fourth switch position kept clear for job-type work. In using the balancer, the operator simply presses the start button, notes the reference mark location and the amplitude of unbalance and then presses the stop button. Electrical braking stops the rotating piece very quickly. After returning the piece to the position shown by the strobe light, the heavy (or light) spot will show up at 12 o'clock. A switch determines whether the 12 o'clock position indicates a light or a heavy spot, depending on whether weight is to be removed or added.

An ordinary shop drill press can be used, back-to-back, with the balancer, or a drill press base may be placed under the recess beneath the balancer. Drilling, to remove weight, may be accomplished with the piece in the balancer.

For more data circle 114 on Postpaid Card

★ modern machine shop ★

LAPPING MACHINE AND DRESSERS

In Booth 3835 J & S Tool Co., Inc., 871 Dorsa Ave., Livingston, N. J., will display the Model L-2 small center lapping machine. This unit will lap both centers simultaneously in pieces approximately 7 to 8 inches long, at a highly increased rate of production. The small center lapping machine has the capacity for lapping centers from 1/16 inch diameter to 3/4 inch diameter. It contains two opposing precision



KENTRALL Hardness Testers Are Motorized

By removing major test loads automatically, the new motorized Kentralls reduce operator error, increase reproducibility of test results, and raise the productive capacity of the machine—for the same price as hand operated testers.

The motorized Kentralls are available in Combination Testers which provide both Regular and Superficial Rockwell Hardness Testing in a single machine. For those applications that do not require the additional range, Kentrall also makes single purpose testers for either Regular or Superficial testing alone.

For complete information write for Bulletin CRS-60.

KENTRALL THE TORSION BALANCE COMPANY

Main Office and Factory:

CLIFTON, NEW JERSEY

Sales Offices: Chi., Ill.; San Mateo, Cal.

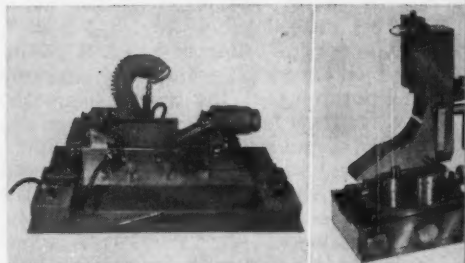
TB-164

For more data circle 528 on Postpaid Card

ASTME Tool Show . . .

high speed spindles that are individually rheostat-controlled to make possible a variable speed range. The workpiece is held in two adjustable V's, permitting center holes to be off-set in relation to the lap. This creates a semi-grinding operation, and product produces a true round hole. A small difference in the speed of the spindles produces the rotation of the parts.

Also to be shown is a dresser which has adjustable diamond height and two holders for the diamonds. This is primarily for use on universal grinders where the dresser needs to be mounted on a solid angle ramp and both the external and internal grinding wheels must be dressed. Actual limitation is 14 inch wheel diameter, however for rigidity, 12 inch wheel diameter is recommended as maximum. The Model "RFG 650A" has a removable microm-



(Left) View shows J & S Model L-2 Small Center Lapping Machine and (Right) Model RFG 650A "Fluidmotion" Wheel Dresser

eter base for controlled infeed of the diamond on surface grinders.

In addition, the company will display its "Fluidmotion" Wheel Guard Dresser. This unit is adaptable to spindle housings 3 to 3½ inch diameter and includes an inverted base with compound micrometer lead screws for maintaining position of a formed

The best sheet metal **ROLLER LEVELER** we've ever built!



Send for **FREE BOOKLET**.
Our brochure gives complete
specifications and data.
Write for your copy **TODAY**.



WOEHR ROLLER LEVELERS

(in several standard models)
flatten steel, aluminum, brass and
copper in widths up to 60"
... in gauges .010 to .125! Your
fabricating capacity and efficiency
are increased *immediately!*
Safe, one-man operation is
simple and accurate.

f.a. WOEHR machine co.

156 FAVOR STREET • ROCHESTER, NEW YORK

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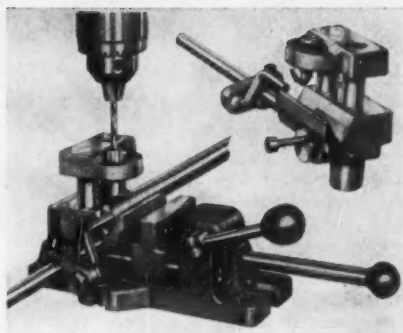
grinding wheel in relation to the work. It is adaptable to 7 or 8 inch wheels, and may be used with the present Model "F" fluidmotion wheel dresser on 7 inch wheels.

For more data circle 115 on Postpaid Card

★ modern machine shop ★

DRILL JIG ATTACHMENT AND VISES

A production drill jig attachment will be displayed by Heinrich Tools, Inc., Dept. 111-C, Racine, Wis., in Booth 1227. The new drill jig attachment converts a Heinrich Grip-Master Vise to a fast-action adjustable drill jig for precision cross hole drilling of $\frac{1}{8}$ to 2 inches round or hex stock. In addition to this jig attachment, Hein-



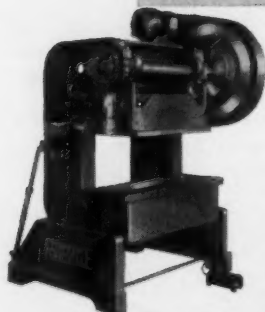
Heinrich Drill Jig Attachment for Vises

rich will exhibit its full line of Grip-Master Vises, as well as several other products.

For more data circle 116 on Postpaid Card

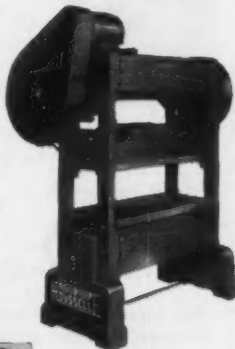
High-Output with **ROUSSELLE**

DOUBLE-CRANK PRESSES



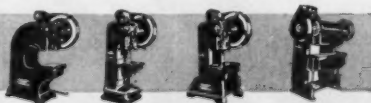
No. 48 DB1 with "Econo-Air" clutch.

SPEED UP PRODUCTION with these versatile 40-ton presses. Large bed and ram areas make them ideally suited to handle wide rolls or sheets . . . do multiple punching, steel-rule die work and other high output operations. For rapid, shockless starting and stopping, presses can be equipped with electrically controlled "Econo-Air" friction clutch . . . Ask for new catalog.



STRAIGHT SIDE—Die space up to 24 in.; bed space up to 6 ft. between uprights.

Choice of over 30 models and types in 5 to 60-ton sizes



SERVICE MACHINE COMPANY

Mfrs. of Rousselle Presses

2310 WEST 78TH STREET • CHICAGO 20, ILLINOIS

For more data circle 530 on Postpaid Card

Rousselle Presses are sold exclusively through Leading Machinery Dealers.

ASTME Tool Show . . .

BAND SAW BLADES

Demonstrations and displays that will lift the mystery and dispel the confusion about the multiplicity of blades available to band saw users will be the feature of the exhibit by The DoAll Co., Des Plaines, Ill., in Booth 2222.

Factory-trained DoAll technicians will duplicate shop and production line setups to show visitors that the right combination of blade and machine is a prerequisite for best results and increased productivity.

A backwall display, "College of Saw Knowledge," will complement the actual sawing demonstrations. It will present clarifying, informative data about five major types of DoAll Blades. The differences between them and the reasons why the right blade and machine must be brought together



Tungsten carbide band saw blade shown on Continental production sawing machine.

as a team to cut any material to the desired tolerance and finish at the lowest cost per cut will be emphasized.

A tungsten carbide blade will be demonstrated on the Continental Production Saw and the C-70 TC. Another step forward in band machining will be demonstrated by the team of a 1613-1 utility machine and a Dart Blade.

A Model 1613-3 Contour-matic Band Machine will be teamed with DoAll's Super Demon Blade to illustrate how vertical band machine users can raise productivity and beat the profit squeeze on production runs.

Also exhibited will be a line of hydraulic equipment for o.e.m., a DH-612 Hand Grinder; gaging equipment and cutting tools.

For more data circle 117 on Postpaid Card

"SEALFLEX" TUBING



**Leakproof—
Stays in place
For Coolants, Cutting
Oils, Solvents**

Made of steel with brass fittings — males, nozzles, stopcocks, etc., made in 1/8", 1/4", 3/8", 1/2", 3/4" I.D. Write for bulletin and prices.

VERMONT FLEXIBLE TUBING CO.

Lyndonville, Vermont

For more data circle 531 on Postpaid Card

Air-O-chek

The Nozzle Valve with the internal fulcrum lever

Available in two models and many sizes

AIR-WAY



AIR ECONOMY

SAVE through superior performance, low maintenance, low initial cost. Air-O-chek air guns are of simple design, sturdy construction, and are easy to use.

Write for details

AIR-WAY PUMP & EQUIPMENT CO.

1046 N. Kilbourn Ave., Chicago 51, Ill.

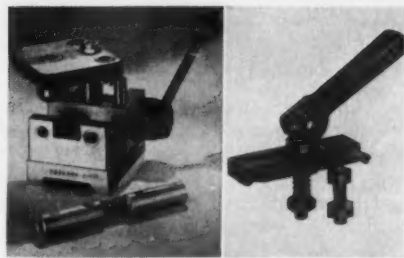
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BUSHINGS, FIXTURES, MACHINED SECTIONS AND CLAMP ASSEMBLIES

In Booth 2254, Accurate Bushing Co., Garwood, N. J., will display four products, (1) drill jig bushings, (2) lift swing drilling fixtures, (3) machined cast iron sections and (4) clamp assemblies and fixture components. Drill jig bushings include those for embedding in plastics and other castable materials, as well as thin wall bushings.

The lift swing drilling fixture is a pump-jig type commercial drilling fixture. Its outstanding feature is the "Swing Away" Top Plate which permits faster loading, easier nesting, availability of the part for inspection, as well as simplified and easier unloading. Jobs can be tooled more quickly and more economically.

ABC machined cast-iron sections can save time and money in both

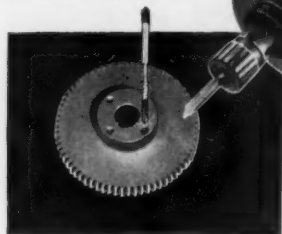


(Left) Lift swing drilling fixture, (Right) Clamp assemblies and fixture component

design and fabrication of jigs and fixtures in many drilling and milling applications. Through their use, accuracy can be obtained without welding. The company's line has been expanded to include clamp assemblies and fixture components such as spring plungers, fixture details, torque screws and others.

For more data circle 118 on Postpaid Card

COMMANDER TAPPER handles "IMPOSSIBLE" tapping job



THE JOB: Tap 4 6-32 holes 11/16" deep in the hubs of production run, heat treated gears.

THE PROBLEM: Excessive breakage of the specially relieved taps used to handle the unusual depth-to-diameter tapping job . . . spoiled parts . . . high

costs. A number of different tappers were tried, but the problem remained.

THE SOLUTION: A Commander Tapper was installed . . . adjustable torque control set to protect the tap and job was resumed.

THE RESULT: 1700 pieces were tapped without breaking a single tap. Tolerances were held and a very high rate of production was maintained. This is typical of the performance a Commander Tapper can produce.

The extreme sensitivity, and wide range of adaptability of a Commander Tapper can be put to work for you; ask your nearby Commander Distributor for a demonstration.

WRITE FOR PRODUCTION
TOOL CATALOG TODAY!

Commander MFG. CO.

4224 WEST KINZIE STREET • CHICAGO 24, ILLINOIS

For more data circle 533 on Postpaid Card

ASTME Tool Show ...

PEAK COUNTER

The Profilometer Peak Counter combination provides a means for counting the number of peaks making up the average reading on the Profilometer meter. The working combination consists of a Profilometer Amplifier, Mechanical Pilot, Tracer and Peak Counter. The stroke can be any desired length within the limits of the Pilot and the average microinch reading can be read directly from the Profilometer Amplifier simultaneously with the reading of the Peak Counter.

The new Peak Counter counts the number of peaks over a fixed distance that are higher than the preset height on the Peak Counter. Now it is possible for industry to specify the number of peaks as well as average readings, providing for better quality control of surface finish.

CENTERLESS GRINDING

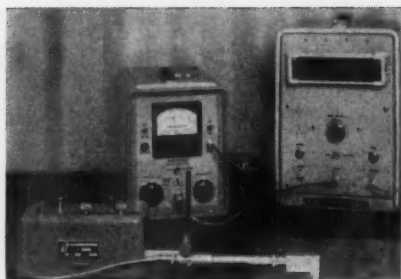
Straight cylindrical, shoulder, profile and multiple diameter, internal and surface grinding of any material. Precision ground taper pins and straight dowel pins. Brown & Sharpe and Swiss Automatic aircraft and standard screw machine parts, heat treated and ground, if necessary. Light bench type production drilling. Prompt service. Send prints for estimates.

31 YEARS—SERVING INDUSTRY PORTER MACHINE CO., INC.

Mfgs. of Por-Matic air operated drilling fixture.
Drill bushings for same in stock.

3139 Enyart Ave. TR 1-4422 Cinti. 9, Ohio

For more data circle 534 on Postpaid Card



Micrometrical Profilometer Peak Counter

The peak counter will be shown by Micrometrical Mfg. Co., 3621 South State Rd., Ann Arbor 7, Mich., in Booth 3617.

For more data circle 119 on Postpaid Card

★ modern machine shop ★

TOOLPOSTS, TURRETS, CENTERS AND MAGNETIC BASE TOOLS

Enco Mfg. Co., Dept. 131, 4520 West Fullerton Ave., Chicago 39, Ill., in Booth 3834, will show its complete line of turret toolposts, tailstock turrets and self-indexing Hexturrets; Micro-Set adjustable center for lathes and grinders and Tiny-Titan magnetic base tools; indicator holders, magnifier holders, lights and so on.

Enco Turret Toolposts have guaranteed re-indexing accuracy to 0.0005 inch at each of the 12 indexing stations, which are spaced 30 degrees

WJZ "BM" BORE GAGES



- Direct indicator reading
- Automatic bore centralization
- No heat transmission
- Full indicator travel
- Simplified adjustment
- Easy maintenance
- More economical

SPECIFICATIONS:

MODEL NO.	RANGE	OVERALL LENGTH	PRICE
1 BM	2 1/2 to 4"	7"	85.00
2 BM	4 to 8"	9"	90.00
3 BM	8 to 15"	9"	95.00

Prices are with .0005" indicator.
For .0001" indicator add \$17.00.

Adjustable Set Master or Master Setting Rings available—prices on request.

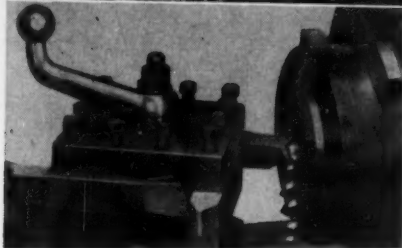
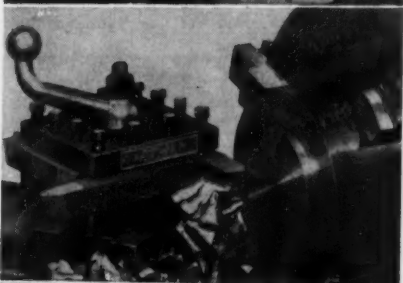
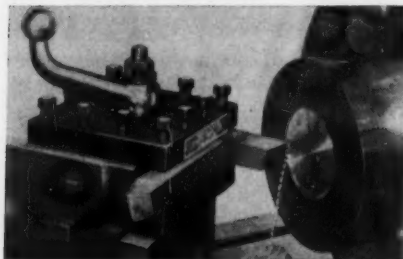
WJZ GAGE AND TOOL CORP., HYDE PARK, N. Y.

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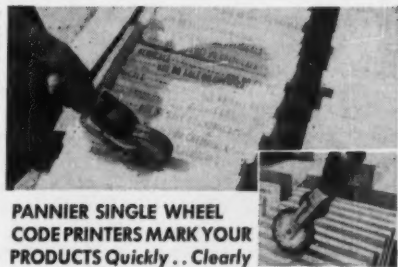
apart. Twelve station indexing permits one tool to do the work of three tools, as each tool may be indexed to three positions.

The Micro-Set adjustable center permits quick, easy center alignment on lathes or grinders. Adjustments calibrated in increments of 0.001 inch on diameter of work. Any operator can align centers in a fraction of the time usually required.

Tiny-Titan magnetic base tools have



(Top) $\frac{3}{4}$ inch square bit mounted in Model 4 $\frac{1}{2}$ -S Enco Turret to face work. (Center) Same tool is indexed to next position to take a 1 inch deep broad-faced cut. (Bottom) Same tool used for inside chamfer.



PANNIER SINGLE WHEEL CODE PRINTERS MARK YOUR PRODUCTS Quickly . . . Clearly

Do you have a product that's hard to mark? The concrete walk blocks shown here are being marked quickly, easily and clearly with a Pannier Single Wheel Code Printer. This is only one of many marking problems solved with the versatile Pannier Wheel Printer. Equipped with a conveyor-type mounting, it can be adapted to your production line.

Pannier Single Wheel Code Printers have an ink fountain designed for longer runs without re-inking. Different styles of wheels are available to accommodate E-Z Set fast-change type, rubber printing dies and logo-types or interchangeable Dovetail Rubber Type in character sizes from $\frac{1}{16}$ " up. These printers are available with or without friction bands to aid printing flat surfaces with small characters, or for non-continuous marking.

Ink fountains are quick-change, permitting you to change color or type of ink to mark different products. Pannier offers a complete line of inks in a wide range of colors to meet your specific marking need. For further information, write:

PANNIER MASTER MARKERS
305 Pannier Bldg., Pittsburgh 12, Pa.

For more data circle 536 on Postpaid Card




The Shield which COMMANDS OPERATOR SAFETY

This new shatter-proof Electro-Lock Shield, due to its interlocked power and light circuits, will not permit a machine to be operated when the Shield is not in a full protective position.

Write for complete information today.

Junkin Safety Appliance Co.
3121 MILLERS LANE • LOUISVILLE 16, KY.

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ASTME Tool Show . . .

a strong magnetic pull to ensure vibration-free anchoring of indicators, magnifiers and lights. Tools can be mounted on flat and round surfaces down to $\frac{3}{4}$ inch round. Fast action cam-type release on duplex models permit quick set-up and release.

For more data circle 120 on Postpaid Card

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PRECISION BELT GRINDER

In Booth 3508, Industrial Machines and Services, Inc., P. O. Box 995, New Britain, Conn., will feature its Kar-Ry Precision Belt Grinder. The accompanying illustration shows a knife blade punch being ground on the grinder.

Odd shapes of punches, dies, cams, templates and blending can easily be ground to a shear line, scribed line,



A knife blade punch is shown being ground on the new Kar-Ry Precision Belt Grinder.

calibrated dimension, master or "to-fit." Most filing and stoning is said to be eliminated. The manufacturer states that profits are increased through lower tool manufacturing costs and marked rise in production. For more data circle 121 on Postpaid Card

Spartan BAND SAWS

Saf-T HIGH SPEED
VAN-KING — REGULAR

By our Spartanized heat
treating methods



Saf-T Bands for jobs that require High Speed alloy blades on special expensive equipment.

Van-King Bands for types of cutting that requires more in value and performance than possible with regular bands.

Spartan Regular Flexible Metal Bands for ordinary cutting.

Write Today for Band Saw Bulletin B

STOCKED BY DISTRIBUTORS

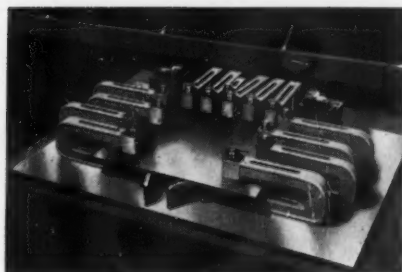
SPARTAN SAW WORKS • SPRINGFIELD 7, MASS.



For more data circle 538 on Postpaid Card

PUNCHING AND NOTCHING UNITS

Wales Strippit, Inc., Akron, N. Y., will exhibit its complete line of self-contained punching and notching units, sheet metal machinery and accessories in Booth 1305. Of special interest will be the new Strippit "BN" Series self-contained hole punching units, primarily used in the metal-working industry for punching round and shaped holes up to 3½-inch diameter in material up to 10 gauge. These new units have been designed for use with or without a guide button. All holders are keyed, making it possible to use both round and shaped punches and dies in the same holder. The new design of the die section permits easy removal and rotation of the die without removing the holder from the setup. This design also retains the advantages and strength of one-piece construction. In addition, the stream-



Mounting template setup of Strippit Series "BN" Punching Units with notching units, work stops and feed rails in stamping press.

lined "BN" holders permit punching closer to the leg of formed flanges and angles; all "BN" holders have hold-down slots for easier mounting; new threaded gauge rods provide more accurate and positive positioning of work; new retainer clips permit faster removal of stripping guides.

For more data circle 122 on Postpaid Card

HUPPERT Floor Model Furnaces Built in 28 Standard Sizes

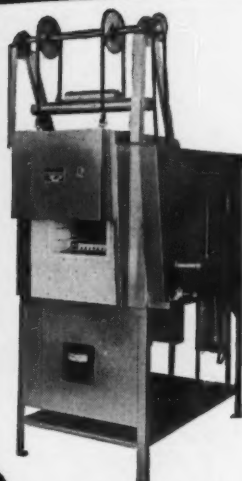
- Continuous operation to 1850°F.—intermittent to 1950°F.—for 2300°F. on special order.
- Complete with indicating electronic controller.
- Tight-sealing, wedge-type door.
- Standard for 220 V. AC, single or 3 phase operation—110 V. or 440 V. on special order.
- Multi-insulation for maximum efficiency.

*Request literature
on complete line of Huppert Furnaces.*

Model No. 16 Illustrated

K. H. HUPPERT CO.
Manufacturers of Electric Furnaces and Ovens

6841 Cottage Grove Ave., Chicago 37, Illinois



Inside Dimensions
12" W. x 8" H. x 18" D.

\$1050.00 complete

For more data circle 539 on Postpaid Card



Zero-Max Variable Speed Drives designed for fractional horsepower applications

Max drives include a larger input shaft on the smaller models for easier adaptation of pulleys and accessories, wider mounting pads and double slotted holes for greater stability and easier alignment, improved gasketing and oil seals and non-heat-conducting control knobs.

Zero-Max variable speed drives give stepless speed control with a finger's touch. They have output range from zero to 1200 r.p.m. with 1800 r.p.m. input. Speed settings can be changed instantly, anytime, running or not. Instant reverse or neutral is available. Stepless from true zero to maximum,



PRECISION TOOL POST GRINDERS

Featuring the circumferentially adjustable spindle assembly—

Mount on any machine tool—In any position—For the precise finishing of any material including ceramics—

- 14 Models $\frac{1}{8}$ to 1 H.P.
- Spindle Speeds to 50,000 RPM
- Use Grinding Wheels $\frac{1}{8}$ " to 6"
- Permanent Lubrication

Write for new catalog

THE MCGONEGAL MFG. CO.

135 MOZART STREET
EAST RUTHERFORD, NEW JERSEY

Telephone GENEVA 8-2313



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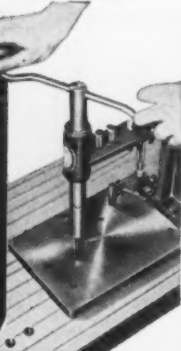


CONTINUOUS HINGES

Manufactured by
**AUTO MOULDING
& MFG. CO.**
 WRITE FOR CATALOG
 1114 E. 87TH ST. • CHICAGO 19

For more data circle 543 on Postpaid Card

**Dahlstrom
TAP GUIDE**
\$89⁵⁰
F. O. B. Factory
 Taps By Hand
 with Drill Press
 EASE and
 ACCURACY



Just spot the hole and turn the handle for fast, easy custom tapping. A ruggedly built Dahlstrom Tap Guide taps straight every time—reduces tap breakage. Saves time lost digging out broken taps. Fastens to bench or carries to job . . . Taps big jobs through base . . . Spindle can tap on lathe or be a tap extension. Comes with 9 adaptors 8-32 to $\frac{3}{4}$ " (taps not furnished) . . . $7\frac{1}{2}$ " throat . . . 8" x $11\frac{1}{4}$ " table . . . wt. 32 lbs. **ORDER NOW—SAVE TAPS AND TIME!** Ask for bulletin on the Dahlstrom line of bench tools.

Branch MANUFACTURING COMPANY
 15 Olsen Drive, North Branch, Minn.
 For more data circle 544 on Postpaid Card

258 MODERN MACHINE SHOP

ASTME Tool Show . . .

Zero-Max drives provide smooth, stable drive with constant torques from 3 to 450 inch pounds. Lever, screw, vernier or remote controls are available.

For more data circle 124 on Postpaid Card

★ modern machine shop ★

MULTI-POINT TOOLS

In Booth 2445, Kennametal, Inc., Latrobe, Pa., will feature the following: (1) "Tailored" Tooling—This display will include a variety of special boring heads, milling cutters, cat heads and other multi-point tools designed for specific operations.

(2) B-7000 Series Solid Carbide Shank Boring Bars—This series of bars will be made in $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$ and 1 inch diameters with non-adjustable heads. They are designed for use where the ratio of length-to-diameter exceeds



(Top) Kendex multi-point tools and (Bottom) Kendex negative rake profiling toolholder

May, 1961

limits beyond those practical for steel bars. The solid carbide shank will provide for closer tolerances and better finish because the high rigidity will reduce chatter and frequently eliminate subsequent grinding operations.

(3) Kendex Toolholder with pentagon insert—The Kendex Style KP Tools have a 30 degree lead angle and accommodate pentagon throw-away inserts of the turnover type. These negative rake inserts provide ten cutting edges with a nose angle of 108 degrees which adds strength to the cutting point. The toolholders are available for general turning and for facing.

(4) Kendex Negative Rake Profiling Toolholder—This negative rake tool securely holds insert during normal cutting, backfacing or contouring and permits a wide range of chipbreaker adjustment by simply turning a thumb wheel.

(5) Kendex Heavy Duty Toolholders

—These toolholders will be available with 1 inch I.C. triangular and 1 inch square inserts of the turnover throw-away type. They are being added to the Kendex line for heavy roughing operations.

Also featured will be a number of dies for parts by cold extrusion. This display will also include many of the finished parts.

For more data circle 125 on Postpaid Card

★ modern machine shop ★

CHUCKS, TOP PLATE AND DEMAGNETIZER

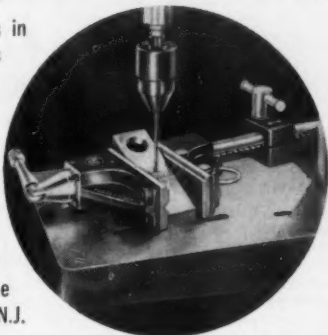
In Booth 2418 O. S. Walker Co., Rockdale St., Worcester 6, Mass., will display the Walker Electroperm Chuck which is a development that eliminates the problems caused by heat generation when holding large ferrous workpieces. Distortion due to thermal expansion is eliminated while dimensional stability of the chuck is maintained.

Instant change cuts production costs

AUTOMATIC KEYLESS CHUCK permits tool changes in seconds without stopping the spindle; prevents chewed-up shanks. One spindle does the work of many. The greater the torque, the tighter the grip.

DRILL PRESS VISE floats, and locks instantly, positively, in any position on the table. Holds work safely for accurate drilling and tapping. Three models: 8", 9" and 12" capacities.

Write for illustrated folder and name of nearest distributor to AMF Tool Division, American Machine & Foundry Company, 224 Glenwood Ave., Bloomfield, N.J.



WAHLSTROM®
AUTOMATIC CHUCKS



FLOAT-LOCK®
SAFETY VISES

For more data circle 545 on Postpaid Card

ASTME Tool Show . . .

The company will also display a top plate for Walker Ceramax Chucks that features intermediary magnetic poles to make the gap divisions finer than previously obtainable. The non-magnetic gaps have been reduced to $\frac{1}{4}$ inch stainless steel to $\frac{1}{16}$ inch stainless steel. The $\frac{1}{4}$ inch poles have been retained and intermediary $\frac{1}{8}$ inch magnetic poles have been added to each chuck.

In addition, the company will display a low frequency demagnetizer. The demagnetizer, originally conceived as a possible solution for the demagnetization of heavy diesel engine heads, works on the principle of subjecting the workpiece to a very strong magnetic field alternating in polarity at a much lower frequency than the usual 60 cycle per second.

For more data circle 126 on Postpaid Card

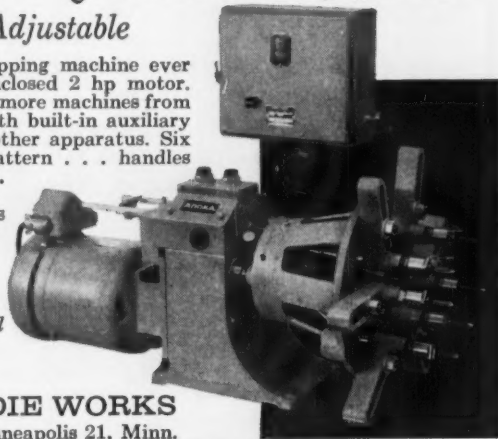


(Top) View of Walker Electroperm Chuck and
(Bottom) Top Plate for Ceramax Chuck

Capacity of six $\frac{3}{8}$ " taps . . . the new **ANOKA** Multiple lead screw tapping machine now yours for \$1,485

Operate Any Position! Adjustable

Highest capacity, most rugged tapping machine ever offered at this price! Powerful enclosed 2 hp motor. Operate in any position. Work 2 or more machines from different sides in one operation with built-in auxiliary switch, or work in clusters with other apparatus. Six spindles are adjustable to any pattern . . . handles 6 N.C. $\frac{3}{8}$ " taps in free cutting steel. Special adaptors for mounting on drill press columns. Lead screws of fatigue-proof steel with tensile strength of 140,000 psi; Brinnell hardness of 280 Rockwell C. Min. stroke: $\frac{3}{8}$ ", max.: 3". Precise depth control. Here's real high production massiveness! Shop-tested for 2 years on production runs.



Write for full details

COLUMBIA TOOL & DIE WORKS

716 39th Ave. N.E., Dept. M, Minneapolis 21, Minn.

For more data circle 546 on Postpaid Card

GRINDER AND LATHE

In Booth 2117, Bentley Industrial Corp., 21-19 Forty-Sixth Ave., Long Island City 1, N. Y., will display the Britain Repetition Lathe and Abwood Tool and Die Surface Grinder. The lathe is a multi-tool machine designed to give an unusually high rate of production. As many as fifteen tools may be used at one setting and the machine will, with unskilled operators, readily produce repetition parts to a fine consistent accuracy. As a general purpose machine, its uses are almost unlimited. It is equally suitable for short runs as well as for long, in view of the extreme ease of setting. Parallel and taper turning, knurling, drilling, internal and external threading, counter boring, recessing profile turning, back cutting and so on, are all readily performed on this machine.

The turret is the main feature of the machine. It carries six tools and is mounted vertically and operates at right angles to the work through a compound slide under complete control from two hand levers held

at the same time, which provide longitudinal and cross movement together with tool indexing. This feature gives to the machine extraordinary capabilities.

The Abwood Tool and Die Surface Grinding Machine is designed specifically for the high production of really flat surfaces to close limits at high rates with fine finishes. The table traverse is completely shockless and is operated by a double-acting hydraulic



Versachek — Differential Switching and special fixture provides fast, accurate, low-cost method for gaging cylindrical surfaces.

New Concept in Gaging and Control!

Now! High magnification, close tolerance, visual gaging with utmost accuracy and reliability, plus ease and simplicity of operation.

Versachek offers these unique features:

- Tolerances within millionths, read at a glance.
- Built-in calibration.
- Common zero for all magnifications from 400:1 to 20,000:1, or more.
- Modular design for easy interchange of units without special skills.
- Power output for operating digital recorders, printers and auxiliary equipment.

Versachek is versatile, too. Using off-the-shelf components you can use Capsules to build custom fixtures and in-process gaging systems, and add modular units — multiple switchers, classifiers, digital voltmeters — to make control, sorting and feedback systems.

Find out about the many ways Versachek can Pay Off for you! Send for Versachek Catalog No. 614.

TAFT-PEIRCE GAGING

9 MECHANIC AVENUE, WOONSOCKET, RHODE ISLAND
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TP 1-6

ASTME Tool Show . . .

piston. An extremely fine and sensitive control is provided, giving a range of 0 to 30 feet per minute. The table trip is slidably fitted so that "stops" can be by-passed, thus allowing table to travel to limit of its stroke for loading and unloading, and remain there until "trip" is rotated in opposite direction, when normal "stop" governed traverse is resumed. Knee elevation

for depth of cut can be effected automatically in graduated steps of 0.0002 inch up to maximum of 0.001 inch at end of each table return stroke, thus making the machine semi-automatic in operation.

For more data circle 127 on Postpaid Card

★ modern machine shop ★

BLACK GRANITE PRODUCTS

Collins Microflat Co., Inc., 3249 West El Segundo Blvd., Hawthorne, Calif., will feature in Booth 3226 a Microflat Black Granite Surface Plate plus, precision Microflat black granite accessories, including angle plates, parallels, and straight edges.

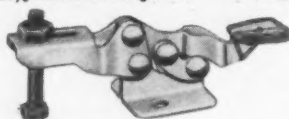
The quality of Microflat products is acquired through the use of modern techniques for obtaining precision flatness. The dimensional stability, high compression strength, uniformity of hardness, and fine grain compact molecular structure, and low moisture absorption content of Microflat black granite qualify this material as ideally suited for precision inspection equipment.

For more data circle 128 on Postpaid Card

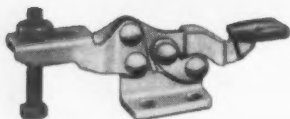
MINIATURE KNU-VISE CLAMPS DO MIGHTY JOBS

These tiny Knu-Vise toggle clamps are capable of exerting 100 to 150 Lbs. clamping force with a reach of 7/8 and 9/16 inch respectively in front of base. Other features are:

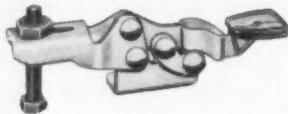
- Clamping height, 19/32 above base.
- Double shear bearing pins prevent clamping spindle side-thrust or tilt.
- Largest diameter pins for size of clamp—80% minimum bearing area.
- When open, spindle head withdraws beyond front of base, permits vertical removal of largest parts.
- All models have replaceable grips.



Four Models
H-100 Twin-flange base



HL-100 Left-flange base



HR-100 Right-flange base



SH-100 Straight base
for side mounting.

All shown 1/2
actual size

Write—TODAY, to Dept. A—for complete information.

Manufacturers of over 150 models of manually and air-operated clamps and pliers

**KNU-VISE
PRODUCTS**

LAPEER MANUFACTURING CO.

3048 DAVISON ROAD
LAPEER, MICHIGAN

WESTERN DIV.: PECK and LEWIS CORPORATION
4436 Long Beach Ave., Los Angeles 58, Calif., ADams 3-7146
CANADIAN DIV.: HIGGINSON EQUIP. SALES LTD.
1131 Pettit Road, Burlington, Ontario

For more data circle 548 on Postpaid Card

RECESSING TOOLS, CHUCKS, STUD SETTERS, DRILLS

Scully-Jones and Co., 1909 South Rockwell St., Chicago 8, Ill., will demonstrate the following products in Booth 2521.

Quick-set tooling for single spindle automatic chucks slashes machine downtime for job changeovers from 50 to 75 percent and justifies smaller runs.

Automatic recessing tools have the simplified adjusting collar with interchangeable stop collars and pilot nose assemblies to quickly adapt one tool to pilot either in a fixture bushing or the work.

Scully - Jones "Better - Hold" Chucks apply powerful and accurate centering fit when simple lock - and - eject nut draws tapered liner into compression in mating taper on i.d. of chuck.

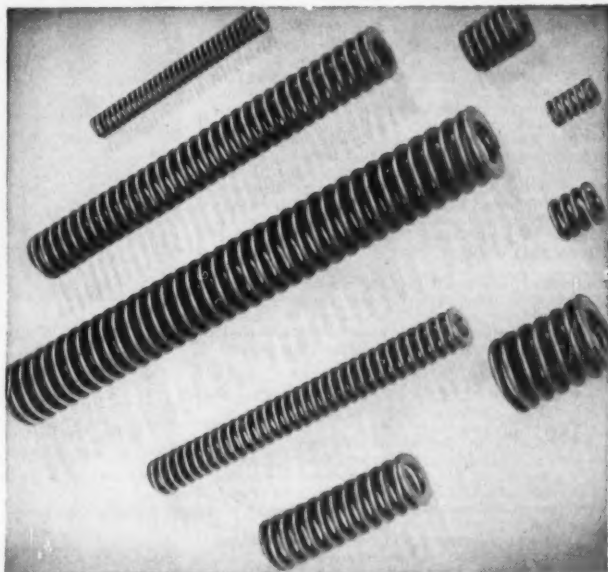
"Stub-A-Long" Chucks permit accurate drilling without guide bushings.

Hydraulic expanding chucking tools hold parts and tools during turning, grinding and inspection operations.

Self-opening stud setters have

interchangeable shanks which quickly adapt them for air or electric power tools, drill presses, radial drills and similar machines.

Scully-Jones "Safe-Torque" Tools use a precise and dependable overload clutch which operates on a principle of overrunning roller drive, releasing instantly and completely when resistance to the driving torque reaches the preset limit.



Die Springs

Chrome vanadium die springs in stock in a wide variety of hole and rod sizes, lengths and deflections. Medium, medium-heavy, heavy duty for increased life and reduced down time. Write for list of specifications and prices, and name of nearest distributor.

5837



**Raymond
Manufacturing
Division**

Associated Spring
Corporation
Corry, Pennsylvania

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MODERN MACHINE SHOP 263

Positions Open For Inquiring Minds In MANUFACTURING RESEARCH ENGINEERING Engineering Special Projects

Bendix of Kansas City, Missouri needs three Manufacturing Research Engineers to do original work with new materials, and close, more exacting work with ordinary materials—Minds that will inquire into the many branches of technology and bring together that combination of techniques capable of producing a unique product. As a Prime Contractor for the Atomic Energy Commission, our function is to give the Weapon Designer the greatest possible latitude in exploiting new materials and techniques. We do this by paralleling his design work with advanced development of manufacturing processes during the design phase. The control of processes must frequently be so precise that automation is required for that reason alone—production quantity notwithstanding.

Engineers who can fill these positions must combine original thought with solid training in the basic physical sciences. They must be able to combine the reasoning of several disciplines in the development of a solution. Minimum requirements include:

- Bachelor's Degree in Mechanical, Chemical or Electrical Engineering.
- Strength in one or more of the following fields: subminiature transformer and toroid production, plastic and rubber formulation and fabrication, sheet metal fabrication, heavy and small parts machining, and fabrication and assembly of precise and delicate electrical and electronic assemblies requiring special environmental facilities.

These are responsible positions for engineers who are qualified to do original and creative work, and who can demonstrate by a record of past professional accomplishment that they possess this ability. Ours is one of the nation's most vital industries. We offer unusually generous company benefits in a Midwestern community which is famous for its beauty and low cost of living. All replies will be strictly confidential.

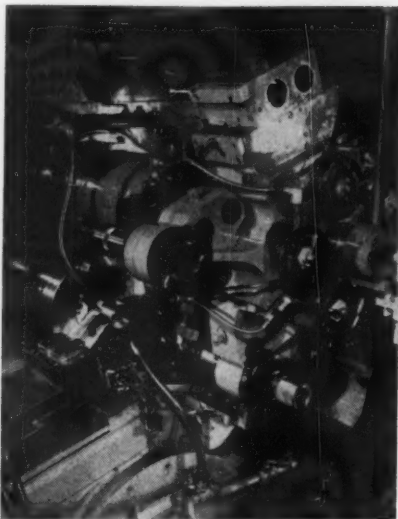
For Personal Interview Send Resume to
Mr. T. H. Tillman
Box 303-UM

THE BENDIX CORPORATION

95th & Troost, Kansas City 41, Missouri
For more data circle 550 on Postpaid Card

264 MODERN MACHINE SHOP

ASTME Tool Show . . .



Scully-Jones "Quick-Set" Tooling in use

Scully-Jones "Cone" Drill produces a wide variety of hole diameters from 3/16 to 1 1/4 inches in thin materials, such as sheet metal, wood and plastics. For more data circle 129 on Postpaid Card

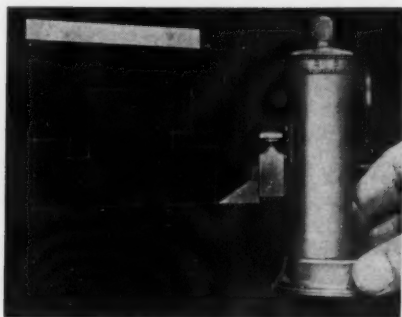
★ modern machine shop ★

GAGES, GRINDING FIXTURE AND PUNCH HOLDER

In Booth, 1233, Montgomery & Co., Inc., 411 Morris Ave., Springfield, N. J., will display micro height gages, bore gage, cutter grinding fixture and punch holder. The micro height gage reads directly from zero at base and eliminates "vernier" adding and subtracting. Its easy to read thousandths scale is machine-cut in graduations of 0.100 inch on barrel and 0.001 inch on head, which measures and scribes up to 11 inches with risers and has an accuracy of plus or minus 0.0005 inch.

In the display the company will

May, 1961



View of Greist-H. B. Micro Height Gage

show the Universal Bore Gage which is a simple holder, to which any "Last Word" type indicator may be attached. A large range of bores, "O" ring grooves, thread reliefs and undercuts can be measured with the one tool.

Also to be included in the exhibit will be a cutter grinding fixture which allows for grinding and sharpening

plain milling cutters up to 6 inches in diameter on a horizontal surface grinder. Another feature of the display will be a handy punch holder, which allows for drilling, assembling and grinding punches without removing them from the punch plate. Self centering and aligning, the holder is designed to accommodate shanks from $\frac{3}{4}$ inch to 2 inch diameter.

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GRINDING VISE AND HAND TAPPING MACHINE

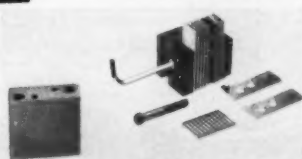
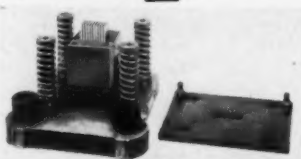
In Booth 2450, Toolroom Equipment Div., Producto Machine Co., Bridgeport, Conn., will display the Model VT-1 Producto Universal Hand Tapping Machine, which is designed for adaptability and complete freedom of action. The Model VT-1 allows for greater flexibility. An operator can instantly swing the tap to any point

Standardize for Progress

with **TRU-TEX**® "Quick Change" **BLADE PERFORATORS and RETAINERS**
(Pat. Applied For)

For slotting and louver Dies

From this  to this  in minutes



Assembly at left is shown with stripper plate removed, exposing the Tru-TEX punch cluster and retainer unit. The right view points up the interchangeability of perforators and illustrates how broken and worn perforators can be replaced with a minimum of down time. No restrictions on the shapes of holes that can be pierced. Blades can be sharpened as a component in retainer. Write for descriptive folder today.

Also distribute and produce Tru-TEX flat ground stock in 3 grades:

Oil-TEX, Air-TEX and "Lo-Carb".
Made by toolmakers, for toolmakers.

**TRU-TEX DIVISION/THE H & R SUPPLY CO., 9925 DALY RD. P. O. BOX 104
CINCINNATI 31, OHIO**

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KELLER Die Filers

3 MODELS

F256-ECONOMY. Rugged table tilts 12° in 4 directions. Has Oilite scotch yoke in oil bath, 2 speeds, 1½" stroke, fast acting chuck.

\$119.00*

F256A-STANDARD. As above plus bracket and file roller support arm that cuts filing time in half.

\$139.00*

F256B-DELUXE (illustrated). Has file roller arm, overarm with spring loaded reciprocating slide, hardened jaws to clamp saw blades, files, abrasive sticks.

\$159.00*

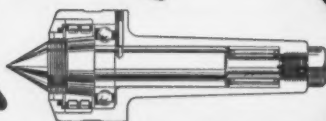
*Complete with motor, wired, ready to run. F.O.B. Factory.

Ask your Industrial Distributor or write:

Sales Service Mfg. Co.

2361 University Ave., St. Paul 14A, Minnesota
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NIELSEN Heavy Duty Live Centers



Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

Write for catalog
M on live centers

NIELSEN, INC. LAWTON, MICHIGAN

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266 MODERN MACHINE SHOP

ASTME Tool Show . . .

on the table, even beyond the table in the case of large parts or fixtures that overhang. A floating arm glides the tap into true hole center without pushing or tugging, and the counter-balanced column is raised or lowered instantly and effortlessly. The tapping machine also requires less tapping torque, reduces thread lead distortion, produces straight tapped holes and eliminates tap breakage.

The company will also feature in its exhibit a precision grinding vise, which allows for grinding square in two planes without removing part from the vise by turning the vise on its side. The grinding vise is easily restored to original accuracy; it disassembles simply and quickly and all components



View of Product Universal Hand Tapper

May, 1961

can be ground simultaneously. The vise includes full-length clamping flange, both sides, for maximum rigidity. Formed wheel grinding is simplified because the toolmaker can more readily hold, grind, and inspect complex contoured parts, especially small or non-magnetic parts and so on.

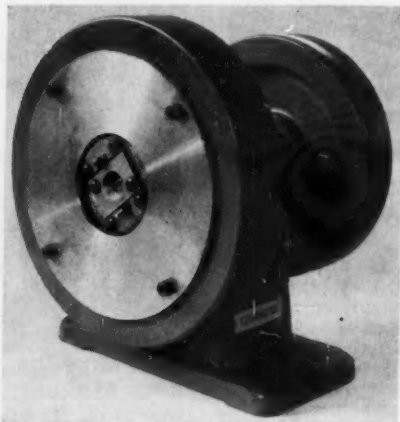
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★ modern machine shop ★

ROTARY SWAGING MACHINES

In Booth 2105, The Torrington Co., Torrington, Conn., will exhibit rotary swaging machines including the new Torrington 111 DC Rotary Swaging Machine which is said to be ideally suited for the manufacture of small components for electronic equipment, business machines and instruments. The closing action of the dies in the DC machine can produce sharp shoulders on the part. This motion also allows diameter reductions at the center of the piece. There is no chip loss; the swaging process elongates the blank, thereby substantially reducing the material cost.

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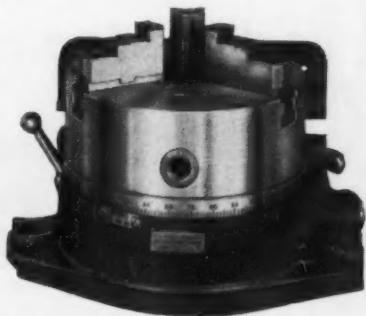
Torrington 111 DC Rotary Swaging Machine

May, 1961

HARTFORD
Special

SUPER-SPACER

8", 12" and 24" Models



ACCURATE indexing fixture

RUGGED work holder

for • milling • spotting
• drilling • and many
• planing other
• boring applications.

Write for detailed literature
and prices.

THE HARTFORD SPECIAL MACHINERY CO.
3700 COLLEGE HIGHWAY
SIMSBURY, CONNECTICUT

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MODERN MACHINE SHOP 267

ASTME Tool Show . . .

INDICATORS, GAGE AND RECORDER

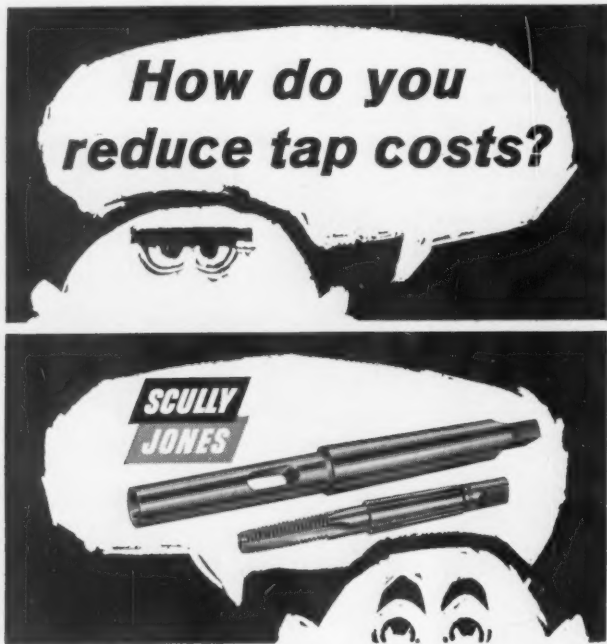
In Booth 1428 Cleveland Instrument Co., 6220 East Schaaf Road, Cleveland 31, Ohio, will display the Cleveland Indi-Ron Roundness, Concentricity, and Squareness Gage, which is now available with a turntable tilt adjustment. This wedge action turntable enables the Indi-Ron operator to

quickly adjust the work piece position so that its axis coincides exactly with the ultra-precise spindle axis (accuracy to 0.000001 inch both axial and radial).

Also in the exhibit will be the Cleveland Polar Recorder which was designed for use with the Cleveland Ex-Ac mounted on a precision spindle machine such as a jig-borer or jig-grinder. By this means it is possible to measure and record the roundness, concentricity and squareness characteristics of a part within the accu-

racy of the machine spindle. The Polar Coordinate Recorder has the advantage of retaining angular relationships and making it possible to check eccentricity by center displacement. The standard Polar Recorder is equipped with a 2 RFM synchronous motor to correspond with machine speed. Other speeds and means of driving the recorder can be used.

In addition, the Cleveland Par-Ac Electronic Transistor Wafer Gage will be displayed, which is designed to accurately determine the thickness of transistor wafer or dice. Manually operated, it will check upward of 500 parts per



Scully-Jones Close-Center Tap Drivers and Tap Chucks adapt inexpensive hand taps to pulley tapping operations. Difference between replacement costs of hand taps and pulley taps brings savings of 41 to 81%. Eliminate costly inventory of pulley taps or special length taps with these low-cost, multipurpose tools. Write for Bulletin 4-50 to compute actual savings.

Scully-Jones and Company

1909 South Rockwell Street, Chicago 8, Illinois
For more data circle 555 on Postpaid Card

hour for segregation into the required size categories. Special scales are available, or the unit can be used with the standard scales permitting readings in thousandths, tenths or millionths of an inch.

The Indi-Ac, Sr. Electronic Indicator, also to be shown in the exhibit, is a portable dimensional gage and comparator designed for shop, inspection and gage room use. Typical uses of the indicator include surface plate or height gage work, checking setups, run-outs, backlash, or alignment of part or machines.

Another item to be displayed will be the Cleveland Automatic Classifying System which consists of the basic gaging, amplifier, and relay components used in automatic part gaging and sorting equipment. It is intended for use by manufacturers of automatic gaging or machine control equipment, or companies who prefer to build their own automation devices.

The Indi-Ac, Jr. Transistorized Indicator will also be exhibited. It has an accurate and simple to operate gage head and amplifier which are ideal for

surface plate and comparator work, measurements at and on the production machines, and for incorporation in all types of gaging fixtures.

Another feature of the exhibit will be the Micro-Ac Electronic Micro-comparator which is designed specifically for ultra precision gaging in the laboratory and is rugged enough for production use. A gage head, amplifier and stand make up the complete microcomparator. Dimensional changes

**SURFACE FINISH ANY
BORED HOLE WITHOUT
GRINDING OR HONING!**

**Wiedeke IDEAL
ROLLER BURNISHING TOOL**

Put a 4-15 micro inch surface finish in any bored or reamed hole in a single pass. Just mount the tool on any shop machine, make a simple micrometer adjustment, then even an unskilled operator can turn out hundreds of precision-finished pieces an hour. For through hole and blind end burnishing. Tool is self-feeding; rolls retract automatically. Nominal sizes, .375"—8.000", adjustable. Write for Bulletin RB-17; free on-your-job demonstration if you wish.

B-3



The Gustav

WIEDEKE

Company

DAYTON 1, OHIO

quality cold-rolling tools since 1892

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RICE MILWAUKEE DIE FILERS

**The Complete
Die-Making Machines
for all operations . . .
FILING — SAWING
LAPPING**

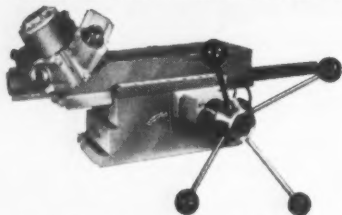
- Work table tilts 4 ways
- 11", 13" and 18" table sizes
- Choice of 2 or 4 speeds or infinitely variable, 100 to 475
- Improved overarms
- You can dial correct speed and stroke with Model FS-VSS

Send for Bulletins on the complete Rice-Milwaukee line of Die-Filers and Profile Grinders.

RICE PUMP & MACHINE CO.
226 PARK AVE. BELGIUM, WISCONSIN
In Milwaukee's Great Industrial Area

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ENGINE LATHE ACCURACY TURRET LATHE PRODUCTION



For any lathe from 10" to 24" swing.
Repetitive indexing in all 6 positions to plus or minus .0003.
Turret body does not raise up when indexing.

Write for folder.

RELIABLE REPRESENTATIVES WANTED

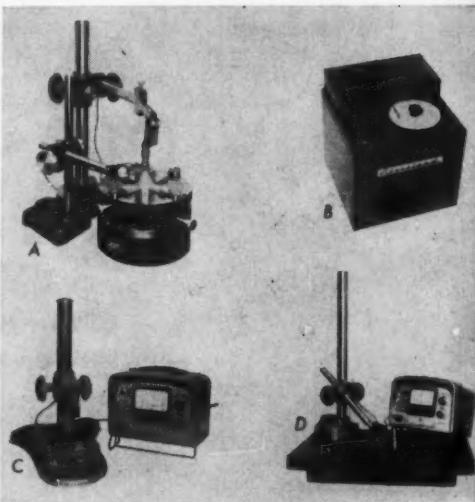


**OLSON INDUSTRIAL
PRODUCTS, INC.**
40 W. WATER ST.
WAKEFIELD • MASS.

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270 MODERN MACHINE SHOP

ASTME Tool Show . . .



View shows (A) Indi-Ron Action Turntable, (B) Cleveland Polar Recorder, (C) Cleveland Par-Ac Electronic Transistor Wafer Gage and (D) Indi-Ac Senior Electronic Indicator

at the gage tip are displayed on the meter magnified up to 100,000 (10 millionths of an inch change moves the meter pointer one inch).

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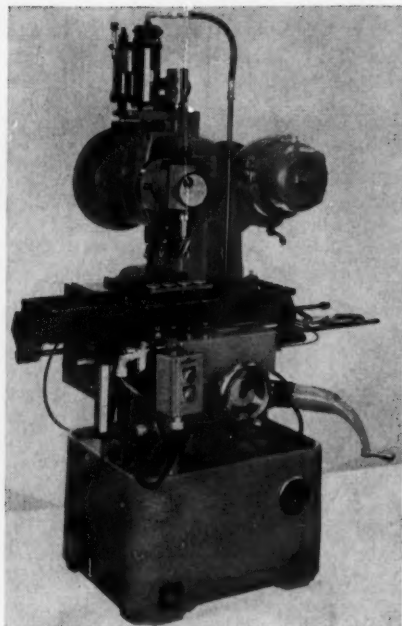
★ modern machine shop ★

MILLING MACHINES

In booth 1128, REM Sales, Inc., 5004 Farmington Ave., West Hartford, Conn., will show latest versions of its Twin Mills and semi-automatic production millers.

The illustration shows a Model 8SA Semi-Automatic Production Miller having both automatic rise and fall spindle cycle and automatic table feed. Machines of this type will be exhibited in two sizes, with a variety of rise

May, 1961



85A Semi-Automatic Production Miller

and fall spindle motions synchronized with automatic table movements. A "skip-milling" demonstration will show how widely separated surfaces can be milled at one setting, with rapid traverse between cutting positions to avoid "milling air." A broad range of typical milled parts and milling accessories will also be shown.

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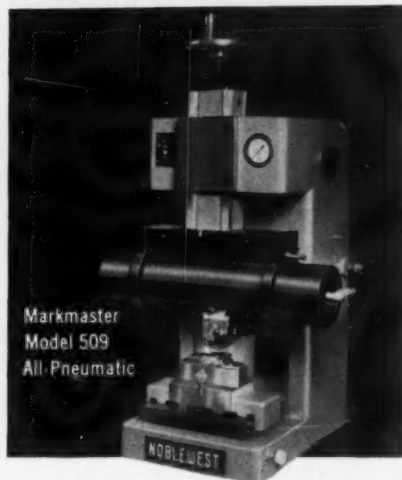
LATHE SPINDLE AND COLLET STOP AND TOOL POST

In Booth 3839, Aloris Tool Co., 419 Getty Ave., Clifton, N. J., will display a universal lathe spindle and collet stop, designed for use with all lathes, turret lathes and screw machines. Aloris Spindle and Collet Stop is com-

May, 1961

PRECISION MARKING *

**AT LOW COST WITH
NOBLEWEST BENCH MODELS**



Markmaster
Model 509
All-Pneumatic

Noblewest bench models represent outstanding value in machines for **permanently** indented metal marking. Available in many sizes and types from light duty to all-pneumatic models that have the features of larger, more costly floor models.

NOBLE & WESTBROOK MANUFACTURING CO.
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MARK-O-RAMA

Booth 3130—Tool Exposition



mark it best with

NOBLEWEST

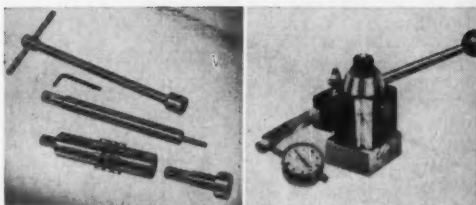
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MODERN MACHINE SHOP 271

ASTME Tool Show ...

pletely self centering and takes only a few seconds to install. Greater rigidity insures duplication and cuts rejections to a minimum.

The company will also display a super precision tool post that guarantees plus or minus 0.0001 inch accuracy. No matter how many times tool holders are changed, the 0.0001-inch

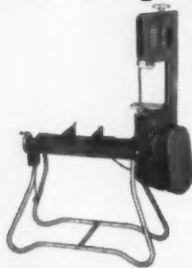


(Left) Universal Lathe Spindle and Collet Stop and (Right) Precision Tool Post

NOW...big machine quality in an economy priced compact band saw



Use it as a horizontal cut-off machine.



Use it as an upright band saw.


THE NEW WELLS MODEL 300 METAL CUTTING BAND SAW

Would you like to make your metal cut-off jobs easier and more efficient? Would you like to be able to cut angles, slots, notches and bevels in the same machine?

You can do all of this with the new economical-to-buy and economical-to-use Wells Model 300 Metal Cutting Band Saw. Just check these features:

- $3\frac{1}{2}$ " x 6" capacity ($3\frac{1}{2}$ " dia., rounds)
- Selective speeds of 54, 100, 190 ft. per min.
- Gravity feed and automatic shut-off for cut-off work
- Exceptionally rigid construction
- Well guarded—blade can be changed without removing guard
- Optional wheels and handle for complete mobility

Get full details on this remarkable value from your Wellsaw Representative or write for Bulletin No. 230.



61-1A

SAW SPECIALISTS SINCE 1925

WELLS MANUFACTURING CORP.

808 Tyler St., Three Rivers, Mich.

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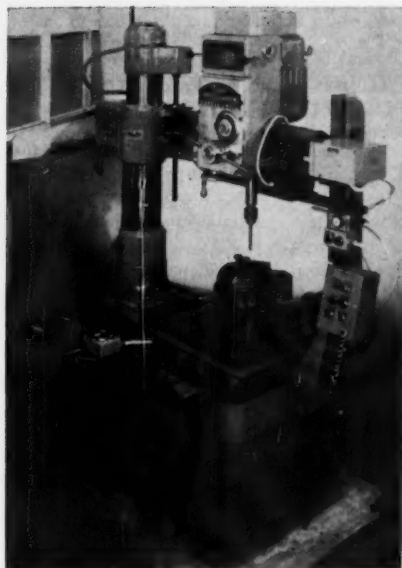
tolerance is said to be maintained, even when deep boring. A tapered sliding gib tool post pulling in on the holder provides this lock assuring absolute rigidity.

For more data circle 135 on Postpaid Card

★ m m s ★

NUMERICAL CONTROL SYSTEM

In Booth 2135 Diehl Manufacturing Co., Finderne Avenue, Somerville, N. J., will display its Singer Numerical Control System, with a point-to-point, two-axis positioning, in operation with the Veetmatic Precision Drilling Machine. The head of the Veetmatic, driven on a gantry arm, provides one of the two axis, while the hori-



View of Singer Numerical Control System

zontal table motion supplies the other. Each derives its motion and control from a Diehl motor drive assembly and position indicator. Both of the axes will be numerically controlled by tape input on the model to be displayed. The 24 by 24 inch table, which has a load capacity of 1,000 lb., is capable of traverse distance of 18 inches while the head will travel 21 inches on the gantry arm. Traverse speed for both axes is 60 inches per minute.

The Veetmatic with Singer Numerical Control achieves accuracy of, plus or minus, 0.001 inch. The maximum height from the work table to the spindle is 30 inches and the spindle has a runout tolerance of, plus or minus, 0.0002 inch.

For more data circle 136 on Postpaid Card

PRECISION TOOL GRINDER

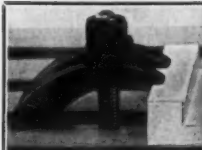
"KSM" with Indexing Head for tools up to 2" diameter.



Demonstrated at ASTME Tool Show,
Booth #3938

ANTARES INSTRUMENTS INC.
55-02 37TH AVE. • WOODSIDE 77, N. Y.

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Unconditionally
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NEW INSTA HOLD-DOWN CLAMPS

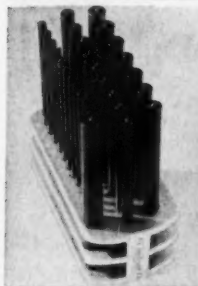
"CLAMPS WITHOUT
SHIMS"

Holds work securely on:
Jig Borers • Planers
Punch Presses • Drill
Presses • Mills • etc.
Write for Bulletin 47-A

Insta clamp

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SPELLMACO "SPOTTERS"

**A matched set of transfer punches
for toolmakers, machinists and tool cribs**

Used for transferring location of threaded, drilled
and reamed holes, slugs, blanks, etc.

Precision made of finest tool steel—Carefully heat treated and tempered for
long life—.0025 undersize to facilitate use—Black oxide finish.

SET #3-17; 28 punches with indexed stand—sizes $\frac{3}{32}$ " to $\frac{1}{2}$ ", by
 $\frac{1}{4}$ "—plus handy $\frac{17}{32}$ " size. Length $4\frac{1}{8}$ ". ONLY \$19.40.

Single sizes available

R. L. SPELLMAN CO. • URBANA, OHIO

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Gaertner Optical Instrumentation
designed and manufactured in the U.S.A.



Gaertner 2" x 4" toolmakers' microscope for measurement to 0.0001" and 1 minute of arc

You'll find the Gaertner Toolmakers' Microscope as part of the standard inspection equipment in the ideally-equipped shop or lab. It will do the work of many single-purpose measuring and inspection instruments with greater convenience and accuracy.

Full 2" precision lead screws permit measurements over 2" x 2" of the instrument's range without the use of gage blocks or rods.

Independent and combined rotation of the cross hairs in the protractor ocular speed up measurements and simplify measuring procedure. The instrument's versatility may be increased through the addition of such accessories as thread and radius templates, camera and spotting attachments, fine motion focus, direct-reading counters, and interchangeable optics for varying magnification and field.

On display at ASTME Show, Booth No. 3222,
N. Y. Coliseum, May 22-26

For more data circle 564 on Postpaid Card
1275 Wrightwood Ave., Chicago 14, Ill., BU 1-5335

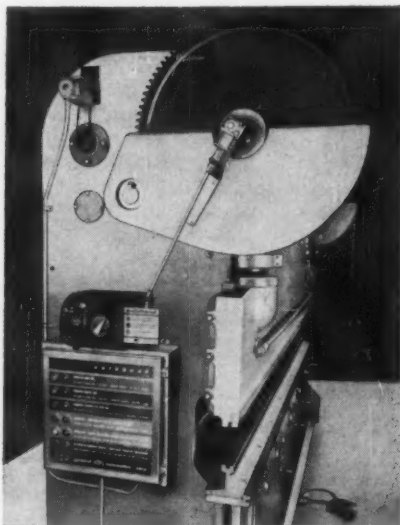
Gaertner
SCIENTIFIC CORPORATION

ASTME Tool Show . . .

PRODUCTION CONTROL FOR PRESS BRAKES

In Booth 1415, General Automation Corp., Dept. A-9, 40-66 Lawrence St., Flushing 54, N. Y., will show that pushbutton control on all press brakes is now possible. "Autobend," a unique production control, automatically eliminates whipping and assures uniform bending. It automatically cycles the brake and provides the correct bending speed.

The company claims that its main features are: (1) pushbutton programming for every type of production and custom work; (2) automatic whipless and uniform bending; (3) stepless speed control from a small fraction to 100 percent, permits peaking to the maximum bending speed that the work will allow; (4) easier

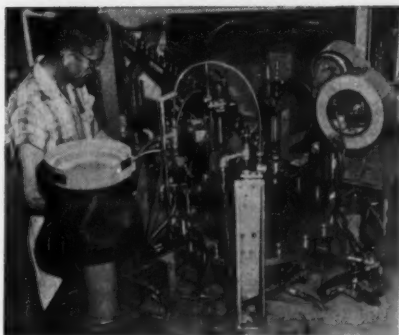


Typical "Autobend" (production control) installation on a press brake. Shown here are the pushbutton control box, the ram positioning switch and the electric foot pedal.

handling of long and troublesome pieces and (5) two operator control of any operation, when desired.

Installation requires no major changes on any press brake. The control can be attached to any size and model brake. It does not require a skilled operator to run it. With the "Autobend," an operator merely steps on the electric foot pedal and follows the work up—all in one easy motion. The "Autobend" eliminates operator guesswork on production runs and increases accuracy on custom work.

For more data circle 137 on Postpaid Card



Spot-A-Motion Idea 0.0-17 will be an operating display in Bellows-Valvair Booth

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VALVES, CYLINDERS, MOTORS, FEEDS

Bellows-Valvair Div., IBEC, Akron 9, Ohio, will exhibit a complete product line in Booth 2517.

There will be both Bellows and

Valvair Air Control Valves, Bellows Air Motors, rotary feed and index tables, drill press feeds, grinder feeds, heavy duty power feeds, two lines of air cylinders (the "Power Dome" and Valvair Heavy Duty Units), Bellows Timers, "Lubri-Air" Units (pressur-



**INTERNAL
CUTTING TOOLS**

4 DISTINCTIVE STYLES
IN CARBIDE & HSS

SIZES FROM $\frac{1}{8}$ " UPWARD

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R. B. TOOL CO. INC.

340 Maple Ave., Westbury, L. I., N. Y.

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BORING



FACING



THREADING



RECESSING



SOLID SHANK TYPE



DETACHABLE HEAD TYPE

WE'RE AT BOOTH 2640, ASTME TOOL SHOW, NEW YORK COLISEUM, MAY 22-26, 1961

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ASTME Tool Show . . .

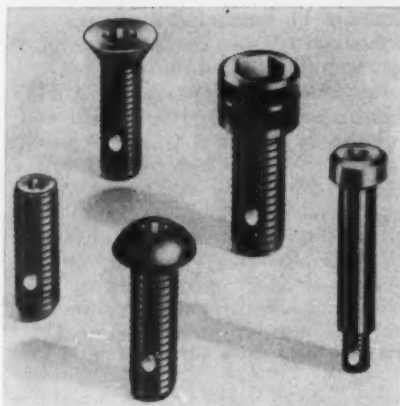
ized-air filter, lubricator and regulator units), drill units (small and heavy duty models, the latter in single or twin spindle), "Spot-A-Mation" displays of Bellows-Valvair equipment in operation as typical cost-saving applications for a variety of production procedures.

For more data circle 138 on Postpaid Card

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SOCKET SCREWS, AUTOMATIC FEEDER AND DRIVER AND WRENCH

The Bristol Co., Waterbury 20, Conn., in Booth 3318, will display its complete line of multiple-spline and hex socket screws in sizes from No. 0 and up with the latest design standards and specifications. Regular, as well as Bristol Nylok Socket Screws, includ-



View shows Bristol Nylok Socket Screws

ing Series 1960 socket cap screws, socket set screws, flat head socket cap screws, button head socket screws, socket shoulder screws and socket pipe plugs, will be displayed.



**New
Electronic
TROUBLE
DETECTOR!**

The MT-1 is a battery-operated transistorized amplifier and sound absorption rod that detects and identifies even faint vibration and sound for correct adjustment. Only 8" overall . . . \$37.50, complete. Calhear Instruments, 412 W. 6th, Los Angeles 14, Calif.

For more data circle 566 on Postpaid Card

MAGNETIC BASE TOOL HOLDER	<div style="font-size: 2em; font-weight: bold; margin: 0;">21</div> <div style="font-weight: bold; margin: 0;">MAGNETIC TOOLS</div>	11 PERMANENT MAGNETS— VARIOUS SIZES AND TYPES
<p>Indicator Holder—$\frac{1}{4}$" dia. non-magnetic stainless steel rod complete with 5/16" and $\frac{3}{8}$" O. D. bushings. Fine precision adjustment identical to surface gage. Hardened ball socket setting permits universal positioning. Powerful 50-lb. pull magnetic base insures firm grip on any ferrous surfaces, curved or flat.</p>		
<p>Write for Catalog #958-A CULLEN MFG. CO., INC. 1603 Washington Ave., Racine, Wis.</p>		

For more data circle 567 on Postpaid Card



FASTER set-ups and positioning

You save set-up and positioning time with Gilbert rotary tables. *Hand-indexing:* 36" and 50" square or round. *Power rotary and power feed:* 36", 50", 60", and 72" square or round. Special tables built to your requirements. For complete descriptions and specifications, write for *Bulletin 854*.

THE CINCINNATI **GILBERT** MACHINE TOOL COMPANY • CINCINNATI 23, OHIO

For more data circle 568 on Postpaid Card

In addition, the Bristol Automatic Feeder and Driver for Socket Screws will be shown. The feeder-driver is a compact, portable machine. Not only can the machine itself be moved from one location to another, but the gun-type driver will automatically receive and drive screws at distances of 25 feet and more from the machine. Also to be demonstrated is the Wrenchking Open-End Ratchet Wrench.

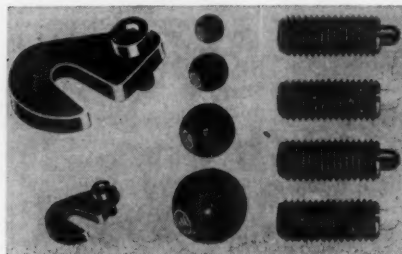
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WASHERS, KNOBS AND PLUNGERS

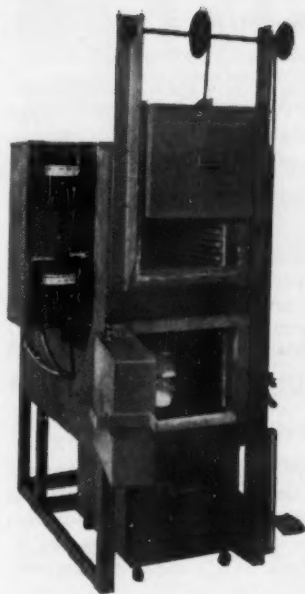
In Booth 3852, Northwestern Tools, Inc., 119 Hollier Ave., Dayton 3, Ohio, will display (1) swing "C" washers, made of low carbon steel, carburized, hardened, ground and rust proofed. These items are used as a latch in the construction of jigs, fixtures, and special machinery. They are generally used for end locations and can be swung out of the way so that the part may be inserted and removed quickly.

(2) plastic ball knobs—These items are furnished with tapped brass inserts. They are used on machine tools, mechanical units, jigs, fixtures and other tooling. They come with a black buff and polish finish. The material is resistant to electricity, water, oils and most chemicals.



(Left) Swing "C" Washers, (Center) Plastic Ball Knobs and (Right) Spring Plungers.

May, 1961



Two series (8012 and 8008) of "space saver" combination heat treating furnaces are produced by Lucifer Furnaces, Inc. Hardening, drawing or preheating, and quenching operations can be performed with one furnace. Each furnace has separate controls permitting independent operation of each unit. The 8012 series chambers operate at 2300, 2000 and 1250°F.; while the 8008 series chambers reach 2300, 2000, and 800°F. The furnaces operate on standard line voltage . . . no transformer necessary. Twenty standard low-cost models are available and each is a complete unit . . . just connect to power supply.

For information about the "space savers", our complete line, or free engineering advice, call on . . .

LUCIFER FURNACES, INC.

Neshaminy 6, Pennsylvania

Diamond 3-0411

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MODERN MACHINE SHOP

LUCIFER "SPACE-SAVER" COMBINATION HEAT TREATING FURNACES

277

ASTME Tool Show . . .

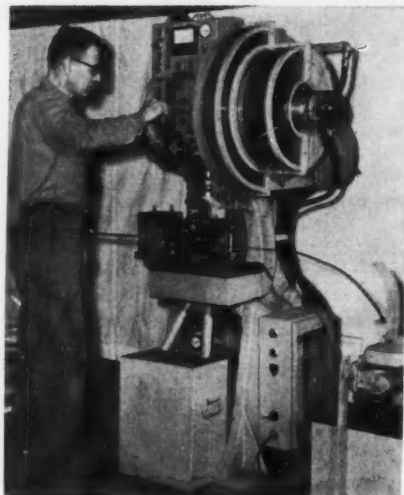
(3) spring plungers—These items, often called spring loaded pins, have a multitude of uses in jigs, fixtures, dies and other tooling applications. They give sure and positive spring tension. The black pentrate nose and cadmium plate nose are case hardened for maximum wear. Both types of plastic noses are used where it is important not to mar metals such as aluminum or brass.

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★ modern machine shop ★

HIGH SPEED PRESSES

In Booth 3801, Dechert Dynamics Corp., Palmyra, Pa., will display a model of its line of Zeh & Hahnemann high speed presses. The press incorporates Dechert's Varistroke feature,



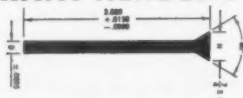
View of Zeh & Hahnemann High Speed Press

which enables the press to deliver strokes of four different lengths, and thus permits a much wider work range. The press, which also features a newly designed gap frame, contains an air clutch mechanism, which is frame-mounted, and assures trouble-free operations by reducing wear on the crankshaft.

While the line of presses is available in sizes ranging from 5 tons to 150 tons, the model to be on display will be a 12-ton open back press.

For more data circle 141 on Postpaid Card

DURANT HEADED PINS



All tool steel Rockwell C 58/60 — honed finish, no pickup — heads left soft and are guaranteed uniform. Attractively priced at \$12. to \$19. per C. We manufacture 103 and stock 103 sizes for immediate delivery.

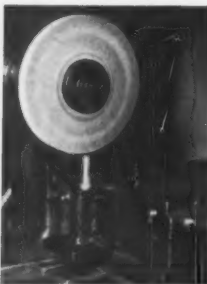
Available through our distributor or order direct.

Write for complete prices and details.

DURANT TOOL CO.

17 THURBERS AVENUE
PROVIDENCE 5, RHODE ISLAND

For more data circle 570 on Postpaid Card



CRALEY Accurate Set Emery Wheel Dresser Dependable Accuracy . . . Practical Labor Saver

Move diamond directly under center of wheel spindle and dress wheel. Now, the diamond, work and wheel face are on the same plane. Note the reading on the feed wheel. CRALEY eliminates the necessity of running the wheel up or down to diamond level to dress, and after dressing, run up or down to find work level.

Write for complete details.

A. B. Craley & Son, 60 Knight Ave., Clementon, N. J.

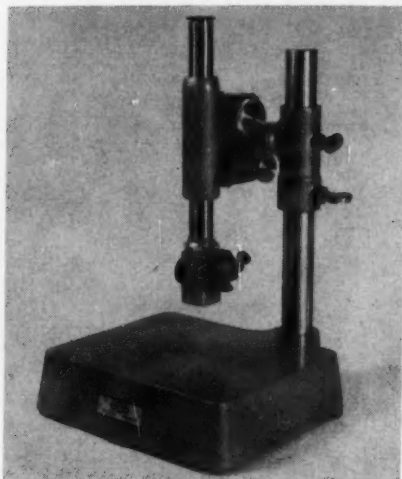
For more data circle 571 on Postpaid Card

MICROSCOPES AND ILLUMINATORS

In Booth 3222, Gaertner Scientific Corp., 1275 Wrightwood Ave., Chicago 14, Ill., will exhibit a versatile line of optical depth measuring devices including micro-interferometers and parfocal projection microscopes used in conjunction with scales, dial gages, micrometer screws and other measuring devices.

Included in the exhibit will be a 6 volt microscope illuminator for use with their microscopes, comparators and toolmakers' microscopes. The unit incorporates a ring of eight miniature bulbs which surround the microscope objective. This illuminator provides excellent contrast on machined surfaces and is particularly valuable for illuminating deep cavities and blind holes.

Also included will be two accessory stages to extend the measuring range of their 2 by 4 inch toolmakers' microscopes. One model increases the range to 2 by 6 inches and the other to 4 by



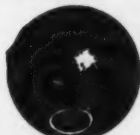
View of micro-interferometer microscope

May, 1961

REID

TOOL ROOM ACCESSORIES

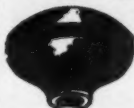
CONTROL BALL HANDLES



Round Plastic



Oval Plastic



Mushroom Plastic

Designed for machine tools, jigs, fixtures, etc. Round and oval plastic types can be supplied in red and black. Made in many diameters and thread sizes. Can also supply highly polished steel ball handles.

FREE 88-Page Catalog

Send for it today. Lists 2000 items needed in every tool room such as hand knobs, compression springs, hand wheels, clamping handles, etc.

REID TOOL SUPPLY CO.
MUSKEGON HEIGHTS MICHIGAN

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New! Improved! FLY-TOOL CUTTER HOLDER

- COST SAVER
- TIME SAVER
- DURABLE
- EFFICIENT
- CAPACITY:

3 convenient sizes with $\frac{3}{4}$ " shank and stand used with $\frac{5}{16}$ " carbide or high speed tool bits. Will machine up to 6" wide surface.

NEW counterbalanced model allows faster speeds and feeds. Made of steel—hardened. Saves on expensive end mills and sharpening costs. Better finishes.

Write for Bulletin. Dealers Invited.

CITY TOOL DIE & MFG CO.

132 Spenser Avenue

San Jose 10 California

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MODERN MACHINE SHOP 279

FELL* LEVELS

to 5 seconds

**Save Time, Insure Accuracy
for Machinery Builders
and Users**



The FELL* PRECISION LEVEL shows the level of all directions at once to an accuracy of .0003 inch per foot or 5 seconds of arc. Other sensitivities are available. Made in sizes 3 1/4" x 6" and 5 1/2" x 12"; also 4" and 5" dia. for fixed mounting. Patented and patents pending. *Trade Marks Reg.

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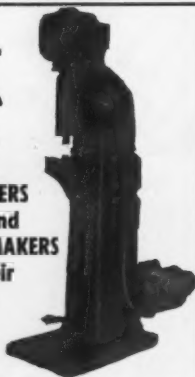
ROCKFORD, ILL.

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**PIONEERS
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PACEMAKERS
in their
line**



—head rivets from smallest to 3/4" diameter cold steel, either by NOISELESS SPINNING or VIBRATING HAMMER method—fast, economically—types include Vertical and Horizontal Spindles, foot-power or automatic.

Free estimates of your work.
Write for catalog today.

THE GRANT MFG. & MACHINE CO.
96 Stillman Ave. Bridgeport 5, Conn.

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280 MODERN MACHINE SHOP

ASTME Tool Show ...

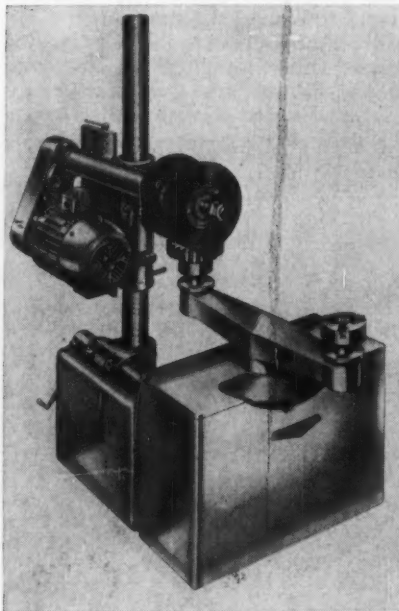
4 inches. These accessory stages may be used on all Gaertner Toolmakers' Microscopes, regardless of age or model.

For more data circle 142 on Postpaid Card

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FINISHING MACHINE

A finishing machine, for high production deburring, edge blending, surface cleaning, polishing and buffing applications will be exhibited by Osborn Mfg. Co., Dept. B-33, Cleveland 14, Ohio, in Booth 2407. The machine consists of a two spindle indexing workholder, and one universal finishing wheel head. Simplicity of design makes the 5224-MIA finishing machine ideal for job shop of continuous pro-



View shows 5224-MIA Finishing Machine

May, 1961

duction runs. The two spindle workholder makes for inexpensive fixturing, while the MIA finishing head is engineered for extreme versatility. Major setup adjustments are built in to achieve any compound angle for positioning of finishing wheel.

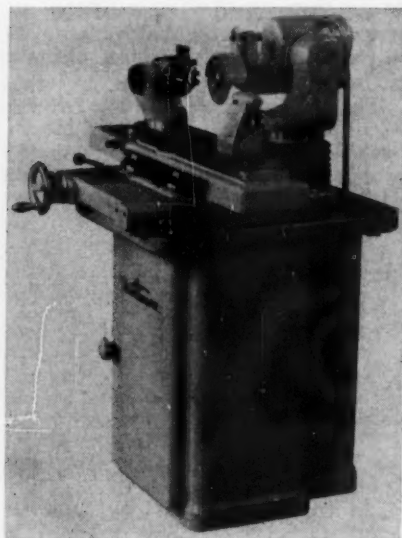
During high production runs, the operator performs the unload and load operation on one spindle, while the gear or part on the other spindle is being deburred or finished.

For more data circle 143 on Postpaid Card

★ modern machine shop ★

CUTTER GRINDERS AND ENGRAVING MACHINES

In Booth 3938, Antares Instruments, Inc., Woodside 77, N. Y., will display the latest design of Kuhlmann Cutter and Tool Grinder, Model FSM, equipped with helical and radial grinding attachments. This machine will handle the re-sharpening and restoration of almost all types of cutters and tools.



Kuhlmann FSM Cutter and Tool Grinder

May, 1961

get
IMMEDIATE
DELIVERY
GUARANTEED
PERFORMANCE



WOODSON MICRO MINIATURE END MILLS

1/32" thru 3/16" in
1/64" INCREMENTS

2, 3, & 4 Flutes
Flat & Ball Ends
Single & Double Ends
1/8" or 3/16" Shanks



Send for this
FREE Catalog Now!



4811 Lennox Blvd.
Inglewood, Calif.

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For Small Precision Work
You Need The . . .

LINLEY JIG BORER

The Linley will meet the most exacting requirements and save you money by releasing your larger borers for heavier jobs. It's a precision tool . . . Versatile and flexible: easy to set up and fast operating. Write to receive complete information on the many improvements that are now standard.

Table Size: 7" x 17 1/2"

Table Travel: 6 1/2" x 10"



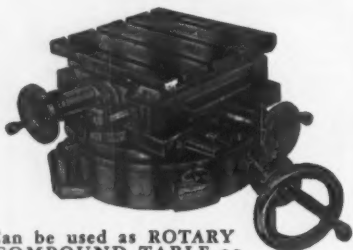
LINLEY BROTHERS CO.
661 State St. Ext., Bridgeport 1, Conn.

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MODERN MACHINE SHOP 281

STEVENS—THREE-IN-ONE

ROTARY COMPOUND TABLES IN 3 SIZES



Can be used as **ROTARY COMPOUND TABLE** or *separated to use individually as Compound table alone and Rotary table alone—all on one investment.*

The Stevens-Three-in-One will save set-up time and reduce inaccuracies caused by multiple set-ups.

See your dealer or write for bulletins

The John B. Stevens Company
Main Street, Somersville, Conn., U. S. A.

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Fortune

TUMBLING MEDIA



for Deburring and Finishing

Preforms in over 300 shapes, sizes and bonds for all barrel and vibratory operations.

- Finest bonding materials
- No "roll-over" of burrs
- Minimum media fracture
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Free lab service reports proper media for your parts.

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11770 DEXTER RD. CHelsea, MICH.
Phone GR. 9-3621

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282 MODERN MACHINE SHOP

ASTME Tool Show . . .

In addition the company will demonstrate the KSM Bench Type Precision Grinder for the sharpening of high speed steel and carbide tools up to two inches in diameter, and its line of Kuhlmann Engraving Machines with attachments to produce masters direct from drawings.

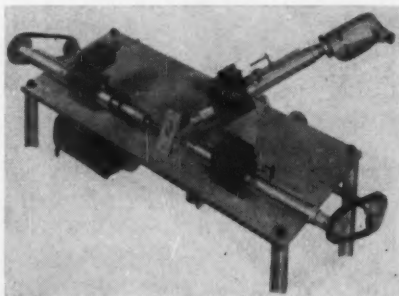
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DRILLING AND TAPPING TOOLS

Commander Manufacturing, 4224 West Kinzie St., Chicago 24, Ill., will exhibit one of the most complete lines of multiple drilling, tapping and related production tools in the industry in Booth 3209. Seven models of the Commander Multi-Drill, three Multi-Tapper models, plus the single spindle Midget and Standard Tappers and the Lead-Matic Lead Screw Tapper will be shown and demonstrated. In addition, a number of the Model "A" Multi-Angle Drill Units will be arranged in a multiple drilling setup to illustrate the use of the unit in difficult, off-line drilling operations.

The high speed air actuated Pneumatic Tapper, which is adaptable for automatic or semi-automatic tapping cycles, will also be in operation. Along with these products, Commander will



Commander Drilling and Tapping Tools

May, 1961

exhibit its extensive line of accessories and attachments for Commander Production Tools.

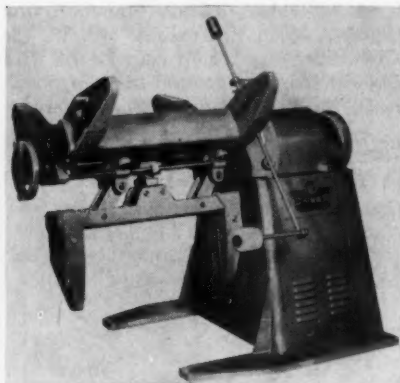
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PRESS ROOM EQUIPMENT

In Booth 1239, Cooper Weymouth, Inc., 605 Honeyspot Rd., Stratford, Conn., will introduce its powered stock reel, Model No. 2500-24MB, which is a heavy duty stock reel for coil stock up to 2500 pounds capacity. These larger capacity reels supply the stock to presses and accessory feeding equipment in a smooth, even flow. Units are power driven and can be synchronized to other equipment by a loop arm actuated mercury switch. They are equipped with electric disc type brakes that are long lasting and smooth acting. Coils are automatically centered and balanced for easy unwinding. Keepers can be rapidly adjusted for fast stock loading.

Also on display will be the Model No. RF 6060 Automatic Roll Feed. Increased stamping press production is made possible by using these roll feeds, which automatically feed coil stock at speeds up to 450 press strokes



Model No. 2500-24MB Powered Stock Reel

May, 1961

Another

VICTOR VALUE

TOP QUALITY—LOWEST PRICES

Our Special Import . . .

DIAMOND WHEEL DRESSERS

Made of selected, full individual stones, mounted in 7/16" diameter x 6" long cold rolled shank.

Karat	Regular Price	Our New Price
1/4	\$ 6.00	\$ 2.85
1/2	12.00	5.00
3/4	21.00	7.50
1	30.00	10.25
1 1/4	54.00	15.00
2	75.00	20.00
2 1/4	102.00	26.00
3	130.00	32.00

These diamonds can be set in any shank to your specifications for \$1.00 each extra.

Order Today—Immediate Shipment from Stock!

VICTOR MACHINERY EXCHANGE, INC.

Dealers in Tool Room Equipment

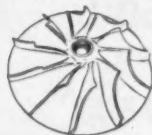
Dept. M, 251 Centre St.

New York 13, N. Y. Tel.: Canal 6-5575

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CERROTECHNICS

saves TIME • LABOR • MONEY
in machining turbine rotors



CERROTECHNICS is the practice of using low-temperature melting CERRO-ALLOYS to expedite many industrial operations.

For instance: An aircraft manufacturer supports the thin blades of turbine rotors in CERROBEND® to prevent distortion in machining. Then the alloy is melted away at 158° F. Write for further information.

*T.M. Cerro Corp.

CERRO SALES CORPORATION

SUBSIDIARY OF CERRO CORPORATION

Room 1501, 300 Park Avenue, New York 22, N. Y.

See us in Booth #1525, ASTME Show, May 22-26

For more data circle 581 on Postpaid Card

MODERN MACHINE SHOP 283

ASTME Tool Show . . .

per minute. Operation is by an eccentric hub from the press crankshaft. One simple adjustment is all that is necessary to change feed lengths. For more data circle 146 on Postpaid Card

★ modern machine shop ★

SMALL CLAMPING TOOLS

In Booth 3838, Wilton Tool Mfg. Co. Inc., 9525 Irving Park Rd., Schiller Park, Ill., will show its Midget Pow-Rlock No. 2800 and Miniature Pow-Rlock No. 2100.

The Midget Pow-Rlock is ideal for use in clamping small items such as electric and electronic parts, control mechanisms and aircraft and missile parts. The No. 2800 has a maximum stroke of 1 inch, oil displacement is 0.69 cubic inch and the maximum heads per booster is four.

NEW
FLYNN

"60"
SERIES

OFFSET
BORING HEADS

This new precision offset boring head is designed for $\frac{1}{8}$ " to 1" bar capacity. Features long, stocky tool block for securing the tool. Vernier simplifies close visual adjustment.

INTERCHANGEABLE ARBORS AND SHANKS
SAFETY ROUND CONTOURS

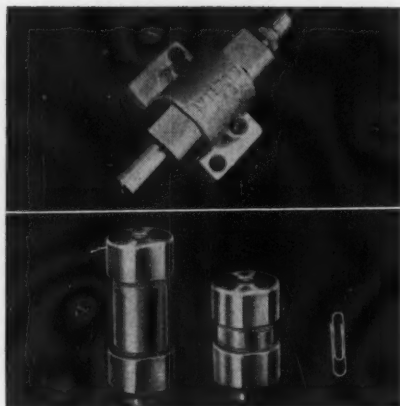
Complete Line of Boring Heads and Tools

WRITE FOR CATALOG

FLYNN MANUFACTURING CO.
18301 WEAVER, DETROIT, MICHIGAN

For more data circle 582 on Postpaid Card

284 MODERN MACHINE SHOP



Midget Pow-Rlock 2800 and Miniature 2100

The No. 2100 has a maximum stroke of $\frac{1}{2}$ inch, maximum oil displacement is 0.345 cubic inch and the number of heads that can be used per booster is eight.

For more data circle 147 on Postpaid Card

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LATHES AND SHAPER

In Booth 1615 Akron Machinery Co., Inc., 45 Crosby St., New York 12, N. Y., will feature the Model 625 Excelsior Single Pulley Shaper with forced feed lubrication and swiveling table. Also in the exhibit will be the Imperial Sliding Bed Gap Lathe with flame hardened, ground bed ways and heat hardened gears. The company

GUN DRILLING HYDRAULIC UNIT

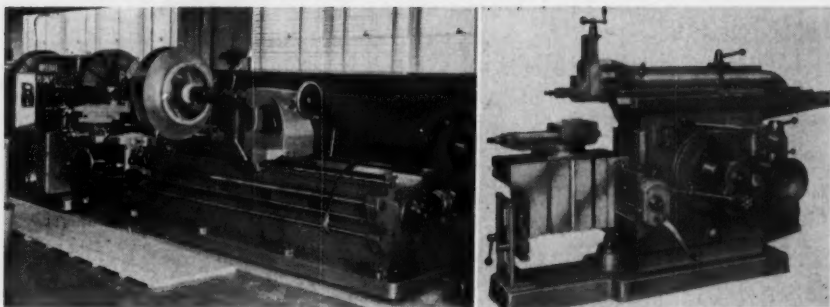
Both high and low pressure pumps and tanks; proper G.P.M. for job. Large filter unit, 5 micron. Pushbutton station. Avey Division, Cincinnati 1, Ohio.



Avey

For more data circle 583 on Postpaid Card

May, 1961



(Left) View shows Imperial Sliding Bed Gap Lathe and (Right) Shaper Model 625

will also feature the Model M4PE Imperial Radial Drill; Imperial Multi-Matic No. 10 Ironworker; Model R20/30 Imperial Lathe, and the Pedersen Vertical and Horizontal Milling Machines which is available in ten models. For more data circle 148 on Postpaid Card

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INSPECTION INSTRUMENTS

The Sheffield Corp., Dayton 1, Ohio, will demonstrate at Booth 1414 the following new instruments and gages.

Sheffield Ferranti FI-22 Measuring Machine. This machine is used for fast, precise measuring of the location of holes and surfaces of parts in two dimensions. It displays the X and Y coordinate readings, simultaneously by lighted numerals on the panel above the gage table. Gaging accuracy ob-

tained over the 15-24 inch range is said to be better than 0.001 inch.

Another instrument to be demonstrated publicly for the first time is the Precisionaire Non-contact Thickness Gage. It measures the thickness of thin, fragile materials such as semiconductor wafers and dice of germanium and silicon without gage point

Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS

Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 8 sizes, from $\frac{3}{16}$ " to $\frac{3}{4}$ " U. S. S. Inexpensive — Last for years.



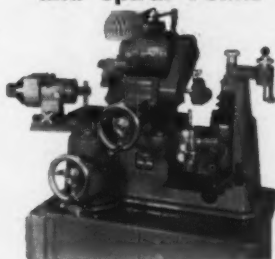
Write for Circular
**NIELSEN TOOL &
DIE COMPANY**
17336 Lahser Road
Near Grand River
Detroit 19, Michigan

For more data circle 584 on Postpaid Card
May, 1961

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TAP GRINDER

Sharpens Chamfers, Flutes
and Spiral Points



MODEL 1100

- Capacities No. 0 Machine Screw to $2\frac{1}{2}$ " Hand Taps. Write for Catalog

HENRY P. BOGGIS COMPANY

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Visit Booth 2642 ASTME Show

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MODERN MACHINE SHOP 285



**Best Economy
for Light-Duty
Stamping Jobs**

- Wedge-Grip design for deep, clear impressions
- Quick type-change feature

Outfits include from 80 to 154 pieces of type—plus a holder made from non-spalling, non-mushrooming Mecco Safety steel. Write for Bulletin UT.

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New RADITURN ✓

CUTS ANY RADIUS
Convex, Concave or Ball

Patented

The accurate short cut for turning any radius. Adaptable to most any lathe.

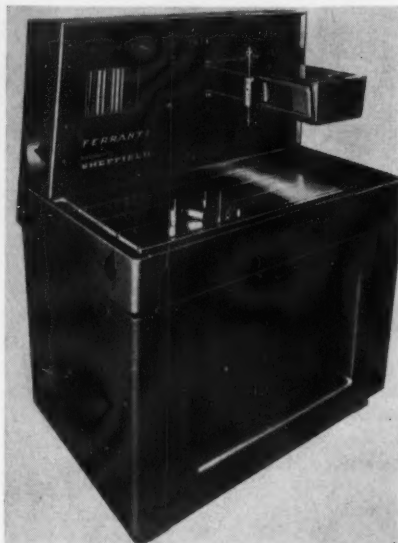
Contact your tool supplier or write for details.

RETCO MFG. & SALES
2115 N. Delaware St. • Indianapolis 2, Ind.

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286 MODERN MACHINE SHOP

ASTME Tool Show . . .



Sheffield Ferranti FI-22 Measuring Machine

pressure by literally floating the part in air during gaging.

A third new item is a pneumatic isolation table to prevent ground and shop vibrations from being transmitted to delicate precision instruments.

Additionally, Sheffield will demonstrate many types of Precisionaire and Accutron electronic dimensional inspection instruments and gages.

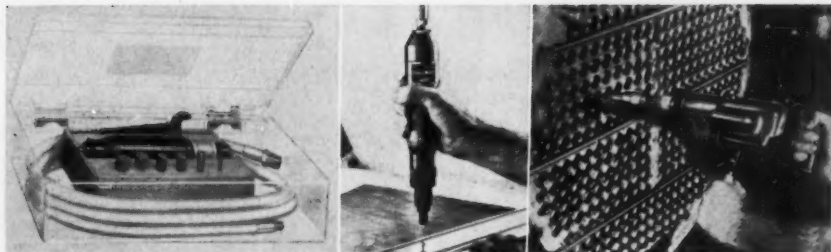
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★ modern machine shop ★

PORTABLE PNEUMATIC TOOLS

In Booth 1441, The Airetool Manufacturing Co., Springfield, Ohio, will display its new precision midget grinder kits, which are ideal for precision tool and die grinding, as well as hundreds of other needs in plant shops wherever carbide mills and mounted points are required. Included in each

May, 1961



(Left) Airetool Precision Midget Grinder Kit; (center) Airetool Model 420 Combination Screwdriver Nutsetter; and (right) Airetool Model 900 Pneumatic Tube Expansion Control.

kit is a grinder, four mounted points, one carbide mill, wrenches, whip hose and plastic case.

The company will also feature a new, lightweight, air-powered combination screwdriver-nutsetter. Designated as Model 420, the new tool includes automatic push starting to speed assembly line operations. It operates at speeds up to 3000 r.p.m. and is a

straight type unit with convenient hand lever control.

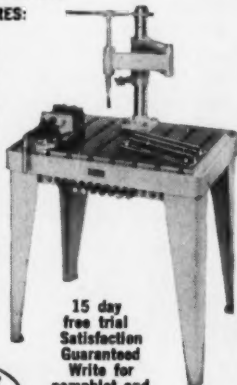
The new Model 900 Airetool Pneumatic Tube Expansion Control, also to be shown, is noted for its speed and ease in accurately rolling steel or non-ferrous tubes up to and including $\frac{3}{4}$ inch size. Featuring a quick reversing push-pull handle, this new, lightweight Airetool unit is particularly helpful in

Allman Universal Hand Tapper 5 TIMES FASTER

A great time, labor and material saver. Fixture taps five holes to every one using the free hand method. Eliminates costly tap breakage.

CHECK THESE FEATURES:

- Articulate arm swings clear of large table for placement of work.
- Limitless number of sizes of tapped holes without moving work piece.
- Vise holds work as small as $\frac{3}{8}$ " square.
- Floating tap locates itself in hole.
- Individual spindle holds taps, thus change requires only seconds.



15 day
free trial
Satisfaction
Guaranteed
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pamphlet and
information

**TOOLS,
INC.**

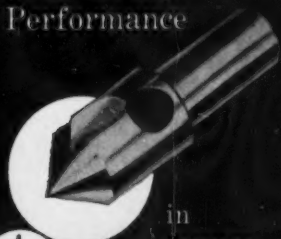
1734 No. 25th Ave. • Melrose Park, Ill.

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May, 1961

CHATTERLESS Countersinking

use
NOBURSINK
for... Unequalled
Performance



- in
- Deburring
 - Chamfering

NOBUR

MANUFACTURING CO.

6860 Formiddle Ave. N. Hollywood, California

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MODERN MACHINE SHOP 287

ASTME Tool Show . . .

increasing production. It is a valuable tool for every industry where fast, accurate rolling of exchanger tubes is a major operation.

Additional products to be exhibited include the recently announced Airetool 400-T Tapper and Airetool Impact Wrench.

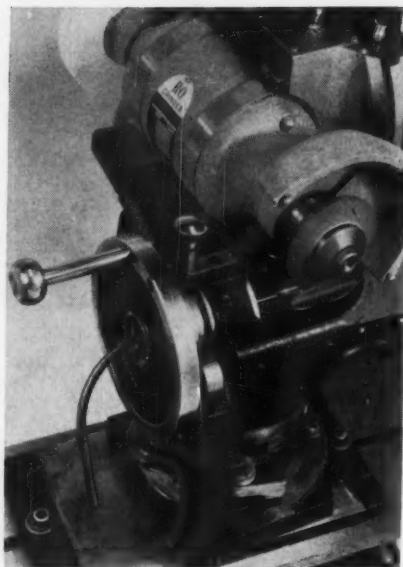
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★ modern machine shop ★

BENT AND HOOK SHANK TAP GRINDING FIXTURE

In Booth 1025, a specialized tap grinding fixture designed for faster, more accurate sharpening of bent and hook shank taps will be displayed by R-O Manufacturing Co., 31171 Stephenson Highway, Madison Heights, Michigan.

The new fixture completely elimi-



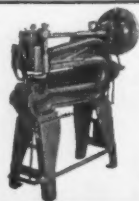
Bent and Hook Tap Grinding Fixture

SAVAGE

NIBBLING MACHINES

- Sheet Metal Cutters
- Roller-Die Type Best for Cutting Stainless Steel
- No Sparks • No Oxidation
- No Secondary Operations
- No Open Flame
- Capacities to 3/4"

DEALERS IN MAJOR CITIES
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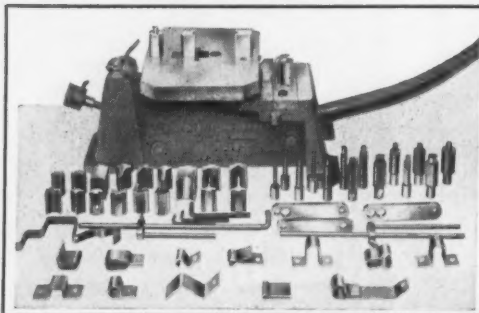
W.J. SAVAGE COMPANY

KNOXVILLE TENNESSEE

For more data circle 590 on Postpaid Card

nates the necessity of removing nib type taps from the shank for flute grinding or relieving of chamfers. Taps are inserted through the collet from the rear, requiring no more than ordinary collet practice in chucking. In addition to time and labor savings in setup, the fixture eliminates resoldering of tap to shank, which often results in tempering or annealing of the tool.

The R-O bent and hook tap grinding



Multiform

BENDER CUTTER

Users report the Multiform Bender one of the handiest tools in the shop. No special tooling . . . Bends, Cuts, Punches, Flats, Rounds into Any Shape, Brackets, Springs, Busbars, Wire Forms, Aircraft Work, and Steel Rule Dies for Metal Blanking.

AIR OR HAND MODELS FOR UP TO 1/4" to 4" MATERIAL

Write for brochure which illustrates and describes the four bender models.

J. A. RICHARDS CO.

Dept. 6-M Kalamazoo, Mich.

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fixture is hand rotated and can be mounted on any conventional cutter grinder table. The unit is furnished standard with cam and index plate for three flute taps. Collets are available for all sizes of taps.

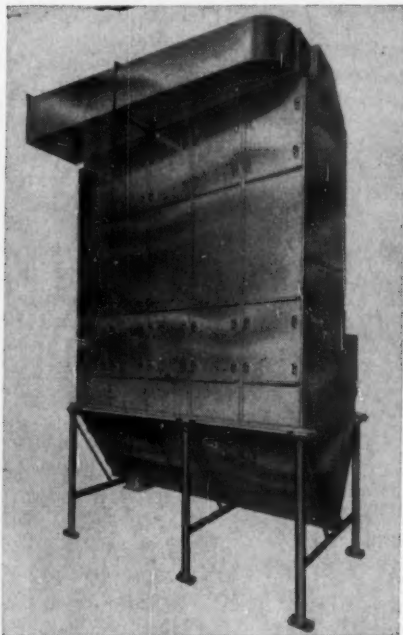
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★ modern machine shop ★

AUTOMATIC DUST COLLECTION EQUIPMENT

A line of automatic dust collectors, whose modular design and self-cleaning action suit them to unlimited applications, will be featured by Torit Mfg. Co., 1133 Rankin St., Dept. 735, St. Paul 16, Minn., in Booth 3810.

The equipment operates at maximum efficiency without interruption due to its unique, fully automatic mechanism. The continuous operating



View of the Torit Automatic Dust Collector

May, 1961

*so
easy
to
handle*



for HI-SPEED SMALL HOLE DRILLING

**New MICRO FEED
and Infinitely Variable
Speed Control**

Never was it easier to drill extremely small holes profitably on a production basis! 4:1 ratio Planetary Micro-Feed . . . for drills down to .004". Standard Feed for No. 60 to 5/32". Variable speed control 1,000 to 10,000 or 2,500 to 15,000 RPM. Direct Motor Spindle.

Write for Literature and Prices

THE ELECTRO-MECHANO CO.

265 E. Erie Street Milwaukee 2, Wis.

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MODERN MACHINE SHOP 289

ASTME Tool Show . . .

and cleaning cycles, coupled with extremely high efficiency, make it ideal for use in metal processing and manufacturing operations and in countless other industries where dust removal can improve working conditions, increase product quality and lengthen machinery life.

For more data circle 152 on Postpaid Card

CARBIDE, H.S.S. & CERAMIC TOOL FINISHING MADE EASY

Now any machine operator can keep his tools sharp and always on the job with this amazingly simple to operate single-head grinding and lapping machine. Plugs into any lighting circuit. Grinds and laps with three-directional stroke eliminating all tool movement by operator. Wheels are removed and replaced instantly without tools. Grinds cold, diamond wheel never needs to be dressed. Complete machine (less wheels) **\$295**

including special tool holder-protractor.



LEONARD PRECISION PRODUCTS CO.
grind-r-lap division, 9200 BOLSA AVE., SANTA ANA, CALIFORNIA

For more data circle 593 on Postpaid Card

AIR AND HYDRAULIC CYLINDERS AND BOOSTERS

Miller Fluid Power Div., Flick-Reedy Corp., 7N023 York Rd., Bensenville, Ill., will display its "College of Cylinder Knowledge" in Booth 2221. It not only provides useful information, but offers much timely data. Miller College Professors will be on hand to take visitors through the various

live displays or "lessons." At each display, taped talks, short and to the point, add forceful meaning to the demonstrations of air and hydraulic cylinders, fluid pressure boosters, and air-oil units in actual operation.

A novel note is the provision for personal operation of each display by the visitor himself, merely by pushing designated buttons or levers. On some of the stands, operating plastic models show the inner workings of cylinders and boosters.

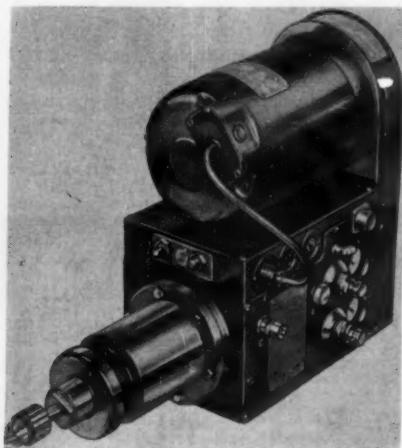
A separate display will clearly depict the advantages of Tru-Seal Fittings at a variety of pipe-thread connections.

For more data circle 153 on Postpaid Card

GRINDING, DRILLING AND MILLING EQUIPMENT

The Dumore Co., 1302 Seventeenth St., Racine, Wis., will exhibit its grinding, drilling and milling equipment at Booth 2428. They will show nine models of the Dumore Tool Post Grinder, a machine tool attachment that converts lathes and other machines to precision internal and external grinders capable of holding accuracy to 0.0001 inch on a broad variety of grinding applications. Seven hand grinder models and three Dumore Flexible Shaft Tools will also be shown. A working demonstration will show how these tools can increase production on various grinding and finishing operations with carbide burs.

The Dumore Series 34 and 36 High Speed Automatic Drill Unit, will be shown for the first time. According to Dumore, this is the first "stock" drill unit to offer speeds as high as 15,000 r.p.m. for automatic small hole production. High speed drilling with these units offers advantages of higher production; cleaner, more burr-free holes and longer life with carbide tooling.



Dumore high-speed automatic drill unit

May, 1961

USE SAWS? HACK • BAND • CIRCULAR

KEEP THEM SHARP!

Automatically • Economically

Learn How—Write Today!



WARDWELL Mfg. Co.

3803 Ridge Rd., Cleveland 9, O.

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DRILL THESE HOLES

BY A QUICK, EASY, INEXPENSIVE METHOD

Your business letterhead will bring literature.

WATTS BROS. TOOL WORKS

Wilmerding, Pa.

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Want Personalized Service On Short Run Stampings?



Send your prints to:

FEDERAL

SHORT RUN STAMPINGS

Federal Tool & Mfg. Co.

3615 Alabuma Ave., Minneapolis, Minn.

Federal Stamping Company

Federal Short Run Stamping, Inc.

7315 Atoll, No. Hollywood, Cal.

915 Lyell, Rochester, N.Y.

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MODERN MACHINE SHOP 291

ASTME Tool Show . . .

Also featured will be the Dumore Micro-Drill in a working demonstration to show the simplicity of drilling 0.004 inch diameter holes with this tool.

Three models of the Dumore Versa-Mil will also be shown.

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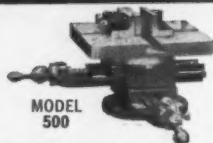
★ modern machine shop ★

STRAIGHT SIDE PRESS

Service Machine Co., Inc., 2310 West 78th St., Chicago 20, Ill., will exhibit a 40-ton straight side press in Booth 3232. This press is furnished with bed areas up to six feet and die spaces up to 24 inches. The unit has rigid four-corner ramp support and enables the user to handle wide rolls or sheets of leather, plastics, paper or sheet metal at top speed. Speed can be increased,



Since 1937 thousands used for numerous jobs on the drill press. 7" rectangular table, 4 1/2" x 4 1/2" travel. \$45.00. Vise jaws \$8.00.



MODEL 500

MASTERCRAFT ENGINEERING CO.

P. O. BOX 4175 • RIVERSIDE, CALIF.
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JIG GRINDING and JIG BORING to your specification

At your disposal: Our sub-contract jig boring department, one of the best equipped in the East.

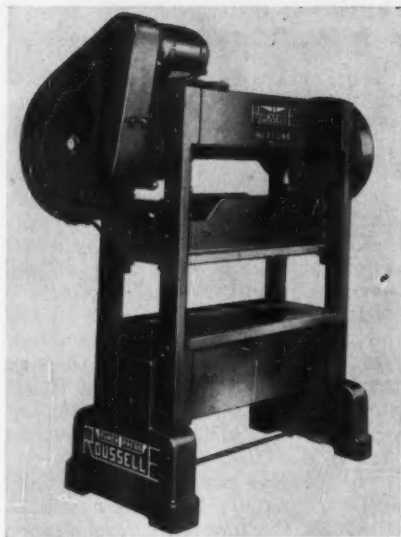
A. K. TOOL CO., INC.

ROUTE 22, MOUNTAIN SIDE, N. J.

Telephone: ADams 2-7300 DIgby 9-1445, N.Y.C.

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292 MODERN MACHINE SHOP



View shows a Rousselle 40-Ton Straight Side Press with 22 by 44 inch bed area

so the company states, when equipped with Econo-Air clutch and brake.

Press starts and stops with incredibly smooth clutch engagements and with extremely low air consumption, without damaging or shortening life of clutch. Simple electrical control with either foot or hand operated switch permits a choice of single stroke, continuous operation or momentary inching or jogging.

For more data circle 155 on Postpaid Card

CUT TOOL COSTS

Twisted or broken tongs replaced at low costs on any tool with a Morse Taper (sizes 1 to 6)

Hundreds of leading industries save money on drills, reamers, countersinks, cutters, drivers, the NU-TANGS way.

Prompt delivery. Send for prices—or send tools for repair. All work guaranteed.

NO WELDING! NO SHORTENING! NO SLEEVES! NO DISTORTION!

GUARANTEED STRONG AS NEW!

Send them to us like this!

broken tools made like new again with NU-TANGS®

We return them like this!

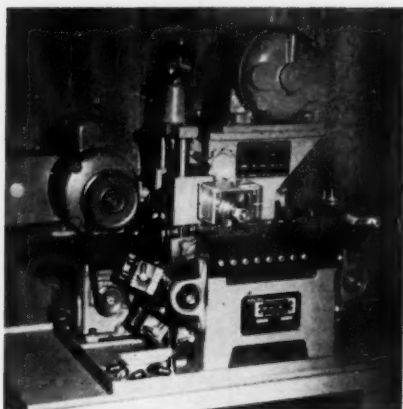
Patent No. 2,712,000

NU-TANGS INC.

1339 Bates Avenue
Cincinnati 25, Ohio

For more data circle 599 on Postpaid Card

May, 1961



Automatic Mill Precision Milling Machine

which is a precision built machine designed to continuously move a wide range of parts beneath a milling cutter to achieve 250 to 6000 machined parts per hour. The matched set of holding bases are hardened and ground accurate to plus or minus 0.00025 inch, allowing machined parts to be held within tolerances of 0.001 inch.

A heavy duty precision spindle, ruggedly mounted in a heavy cast iron base with horizontal and vertical micrometer adjustments, becomes an integral part of Automatic Mill to achieve a compact high production milling machine requiring little floor space.

For more data circle 156 on Postpaid Card

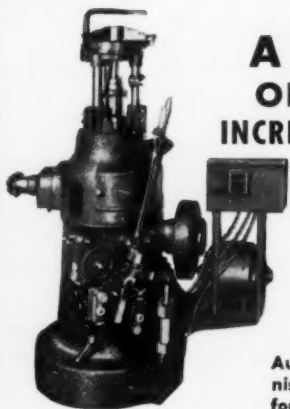
★ modern machine shop ★

BENCH MILLER AND GRINDER

In Booth 3233, Automatic Mill, Inc., Danbury Industrial Park, Danbury, Conn., will feature its Automatic Mill

ELECTRIC FURNACES

In Booth 1724, The Sentry Co., Foxboro, Mass., will have in operation its Model "Y" Electric Furnace of latest



Super High Speed AUTOMATIC FEED OIL GROOVING MACHINE INCREASES PRODUCTION—CUTS COSTS

The first and only Automatic Feed Oil Grooving Machine. Enables operator to run more than one machine, with every cut identical. WICACO CONTINUOUS OIL GROOVER cuts grooves of every description, internal or external, continuous or intermittent. Can be fitted with pneumatic holding fixture, synchronized with Automatic Feed. Send us samples for grooving to specifications, time and cost estimate, without obligation.

Automatic Feed Mechanism can be supplied for older machines. Ask for descriptive booklet.

Manufacturers of PRECISION MACHINERY,
MACHINE PARTS, SCREW MACHINE PRODUCTS,
Roller Bearing Twister Spindles,
Spindle Oiling Machines.

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LeCOUNT

SINCE 1847

EXPANDING MANDRELS

Accurate and
positive work-
holding for:

- Grinding
- Turning
- Milling
- Balancing
- Inspection

CONCENTRICITY
GUARANTEED
UP TO .0001" T.I.R.

For I.D. sizes
from 1/4" to 7"

Widest range of expansion per mandrel; i.e., No. 1A expands from 3/4" to 3/4"; No. 2A, from 1/2" to 1", etc.

Special mandrels can be furnished for your particular job. They can be threaded, made extra long, designed to fit I.D. splines, fitted with locating stops, etc.

Write today for details
and prices.

LeCOUNT TOOL WORKS, INC.

P. O. BOX 252 CHESHIRE, CONN.

ASTME Tool Show . . .



The Sentry Model "Y" Electric Furnace

design, demonstrating scale-free, decarburization-free hardening on "moly" high speed steel. The equipment used will be similar to that shown in the illustration.

Positive, protective atmosphere for high carbon, high chrome and high speed steels is created within the furnace work chamber by Sentry Diamond Blocks. This simple, effective atmosphere requires no adjustment or special operator skills. Tools can be "soaked" in the Sentry Block atmosphere to assure full hardness without danger of surface deterioration.

Tool Show visitors are invited to bring samples of their high speed steel tools for "on-the-spot" demonstration hardening.

For more data circle 157 on Postpaid Card

★ modern machine shop ★

KEYLESS CHUCK

In Booth 1125, Supreme Products Corp., 2222 South Calumet Ave.,

← For more data circle 601 on Postpaid Card

Patent No.
2,544,633



View of Mercury Mark II Keyless Chuck

Chicago 16, Ill., will display a light-weight keyless chuck. It is called the Mercury Mark II and is expected to appeal to anyone who uses a portable drill often enough to be bothered by the use of a key. The chuck, it is claimed, will not jam, slip or mar drill

shanks. Aluminum and plastic are used in the construction, making it weigh less than half as much as earlier model keyless chucks. The light weight and automatic tightening features of the chuck are expected to make drilling jobs faster, easier and less tiring. Capacity of the chuck is 0 to 1/4 inch and the chuck will fit all portable drills having a 3/8 by 24 spindle.

For more data circle 158 on Postpaid Card

★ modern machine shop ★

FORMING AND GROOVING TOOLS

In Booth 3225 Arthur A. Crafts Co., Boston, Mass., will exhibit its "Compound-Relieved" Circular Form Tools. The precision ground inserts used in Crafts style "CFT" holders are made in Carbide, Vasco-Supreme, Tantung or 18-4-1. Now, these inserts are offered with side clearance for those jobs where the conventional

the **ARC-TWIN** *Cuts Two Perfect Notches* in One Downstroke of Press!

SAVING both time and cost, it gives you perfect T-joints — instantly ready for welding or brazing without deformation or finishing! Twin-acting punch shears clean, from inside out, leaving two matching notches (in perfect 180° alignment) with every downstroke of the punch press. Quickly interchangeable dies and punches accommodate pipe and tubing from 1/2" to 2 3/8" O.D.; special units, up to 3" O.D.

Special Arc-Twins for double notching stainless steel or monel metal and units built to your specifications can also be furnished.



PATENTED

Ask for
twin-notched
sample of
pipe
or tubing

VOGEL

TOOL AND DIE CORPORATION

1823 North 32nd Avenue
Stone Park, Illinois

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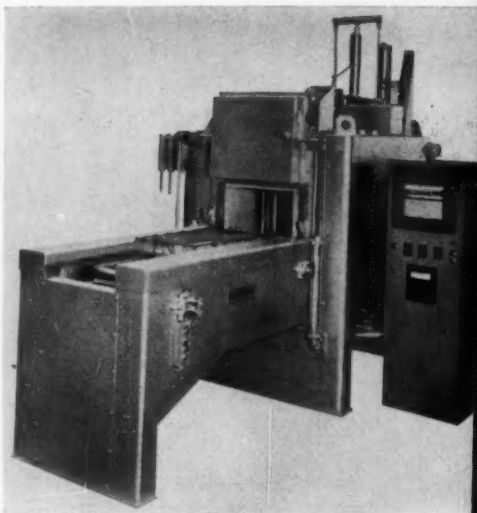
ASTME Tool Show . . .

"dish" clearance alone is not adequate. To be shown also is Crafts Style 1019 Disposable Insert O Ring Grooving Tool, mounted on solid carbide shanks for maximum rigidity, and "Compound-Cleared" for maximum cutting freedom. A live demonstration of Circular Form Tool Sharpening with Crafts Fixture No. 1004 will be on display during the show. For more data circle 159 on Postpaid Card

★ modern machine shop ★

HEAT TREATING UNIT

A fully automatic heat treating unit, combining the latest furnace improvements in one complete package, will be exhibited by Hevi-Duty Electric Co., a division of Basic Products Corp., 304 Hart St., Milwaukee, Wis., in Booth 1423. The Clean-Line fur-



View shows Hevi-Duty Clean Line Furnace

nace, as it is called, is constructed so that it includes in a single unit the principal design improvements which help to speed up production and reduce maintenance costs.

The Clean-Line heat treat unit is available in six standard sizes in gas-fired or electric models. It provides automatic "straight-through" operation from loading through quench.

One important feature is a short loading table, just 1-basket long, which will conserve floor space.

An optional feature now offered on the Clean-Line is a double heating chamber, separated by a sliding door. This makes it possible to maintain two independent atmospheres and two different temperatures.

The complete unit consists of automatic loader and transfer mechanisms, heat treat furnace, atmosphere cooling chamber, oil quench tank with automatic quench elevator, forced agitation oil pump, oil cooler, and control panel.

For more data circle 160 on Postpaid Card

CUT DEBURRING AND CHAMFERING COSTS!
with **D-BUR-R**

No degreasing or fuss when used between operations.

- FASTER • CLEANER • UNIFORM
- ECONOMICAL

Free hand operation — like a table saw!

Write today for literature and actual work sample.

FLOOR AND BENCH MODELS AVAILABLE.

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Pat. Pend.

T. G. PERSSON Mfg. Co.

2 Henry St., Bloomfield, N. J. Pilgrim 3-2629
est. 1936

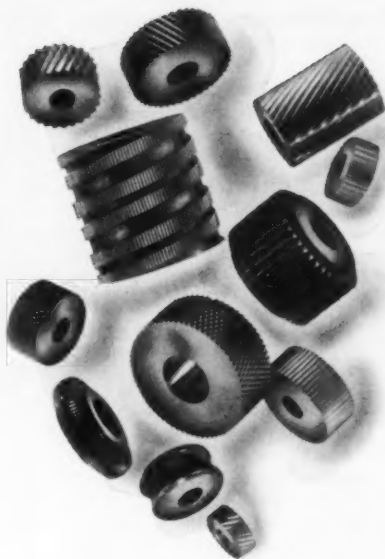
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DRILL PRESS UNIT AND END MILL

In Booth 3846 Custanite Corp., 1228 Utica Ave., Brooklyn 3, N. Y., will exhibit its DP-50 "Custamist" Drill Press Unit, designed to fit the standard $\frac{3}{4}$ inch drill press column by a clamp. The capacity of this all steel tank unit is approximately one quart. The unit has a special two valve control system with individual adjustments for fluid and air. Metal mesh covered nylon lines ending in an 8 inch flexible goose neck tip permit positioning in relation to the work anywhere on the drill press. The "Custamist" DP-50 is designed so that the tank can be rotated 360 degrees around the drill press center post and placed in any position on the drill press in order to give maximum working efficiency on the table. Tank refilling is made possible by an opening in the tank.

The Custanite Company will also display its "Stanite" Profit Margin line of precision made end mills. The "Stanite" End Mills are manufactured of M-2-HSS with a 61-64 Rockwell "C" hardness throughout.

The "Stanite" End Mill line features the



Superior Performance... Longer Life Yours With Reed Knurls

Reed Knurls produce accurate, smoothly finished surfaces. Careful selection of steel, controlled heat treatment and an exclusive lapped finish insure maximum life. Precise manufacturing control provides uniformity of tooth form, diameter, thickness, hole size and concentricity.

Reed stocks over 170 styles and sizes of circular pitch and *diametral* pitch knurls. As the pioneer-leader in the development of all types of thread and form rolling equipment, let us solve your knurling problems. Reed Knurls are stocked by your industrial Supply Distributor.

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ROLLED THREAD DIE CO.



Subsidiary of Union Twist Drill Company

HOLDEN, MASSACHUSETTS

Specialists in Thread and Form Rolling Tools and Equipment
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ASTME Tool Show . . .

most popular range of sizes, from $\frac{1}{8}$ to $\frac{1}{2}$ inch with a $\frac{3}{8}$ inch shank. Both two flute and four flute double end mills are available in the line. Each "Stanite" End Mill is highly finished, quality inspected and checked, performance guaranteed.

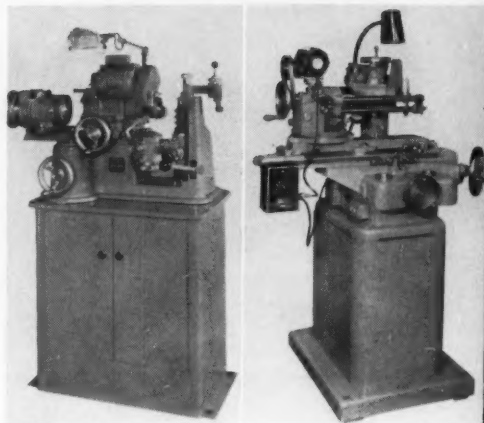
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TAP GRINDER AND RELIEVING FIXTURE

In Booth 2642 Henry P. Boggis Co., 706 East 163rd St., Cleveland 10, Ohio, will exhibit its Model 1100 Hybco Tap Grinder, equipped with size "K" and "L" chamfer and flute heads, and its Model 2100 Hybco Two-Way Relieving Fixture and Grinder. The improved Model 1100 Tap Grinder will sharpen chamfers, straight flutes and spiral points from a No. 6 machine screw tap up to and including $2\frac{5}{8}$ hand taps. All taps are held on their shanks so that they may be resharpened even after the center has been destroyed.

The size "K" and "L" chamfer and flute heads have increased capacity and feature quick-change cam pin plates, making it possible to sharpen taps with any number of flutes. The Hybco Model 2100 Two-Way Relieving Fixture will produce both axial



View of (Left) Boggis Model 1100 Hybco Tap Grinder and (Right) Model 2100 Hybco Two-Way Relieving Fixture and Grinder

and radial relief, in conjunction one with the other, or independent of each other. Unique adjustments provide a variable amount of relief from zero up to the maximum. The exact amount of relief desired can be preset and measured by means of dial indicators.

For more data circle 162 on Postpaid Card

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PRESSES

Perkins Machine Co., Warren, Mass., will display a series of high-production stamping presses in Booth No. 1229. The Series "S" model, available in capacity from 15 to 150 tons, is designed for speedy performance, with quick, easy setting and changing of dies and tools, to save costly downtime.

Among other outstanding features, Perkins claims this press has a very low center of gravity base which permits fast operation with amazing lack of vibration. A rigid frame assures accuracy of work and longer die life.

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END MILL SHARPENING

$\frac{3}{16}$ " — $\frac{5}{16}$ " — \$.80 SIZES THRU $\frac{1}{2}$ "

$\frac{1}{4}$ " — 1" — 1.00

60c

Equally low prices on other sizes.

PER END

Shell End Mill Prices Upon Request
Freight Prepaid on Orders of \$15.00

GOLDEN STATE TOOL CO.

265 S. RAMPART BLVD.
LOS ANGELES, CALIF.

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CHEMICAL COOLANTS

How the newest developments in the cutting fluid and coolant field can bring down unit cost in machining and grinding operations will be the keynote of the exhibit of The Master Chemical Corp., Toledo, Ohio, in Booth 1226. One significant item is its Trim H.D., an all-chemical cutting fluid and coolant especially formulated for the severest machining and grinding heavy duty operations. The product was developed in the company's laboratories where research and engineering of all chemical coolants and cutting fluids are carried on continuously. It eliminates many difficulties peculiar to heavy broaching, reaming, threading and tapping.

Trim H.D. is a white jelly which is diluted with water. It is unique and extremely versatile in that it does some of the toughest jobs on alloys,

stainless and cast iron, yet doesn't stain brass or aluminum. There is no odor, no rancidity, no gumming and no skin irritation with Trim H.D. The face of the work is clearly visible through the translucent fluid. It is easily recovered from sumps.

Another Trim formula especially formulated for band saw cutting is claimed to increase band saw life by almost 100 percent. It also permits sawing a wider range of metals and is said to cut down time for blade changing by 50 percent.

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LOW MELTING ALLOYS

Demonstrations showing the behavior of low melting bismuth alloys under various working conditions will highlight Cerro Sales Corp., 300 Park Ave., New York 22, N. Y., exhibit

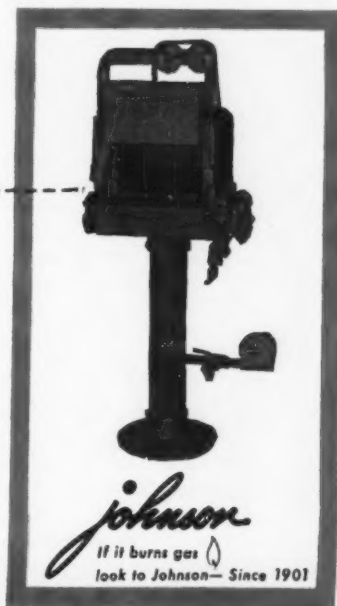
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NUMBER 142 HEAT TREATING FURNACE

Powerful burners in this efficient furnace get heat up to the 1300°-2350° F. range in minutes. Temperatures accurately and quickly regulated. Does fast job with high speed and carbon steels. Ratchet-operated door opens upward. High temperature, refractory-lined firebox is 7" by 13" by 16½". 200,000 BTUs per hour. Carbofrax hearth, G.E. Motor and Johnson Blower included, F.O.B. Factory \$374.00
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ASTME Tool Show . . .

in Booth 1525. Demonstrations will include soldering glass and metal and reproducing surface finishes and contours using a Fiore Alloy Sprayer. Also, company representatives will show the slush-casting method of producing molds for encapsulating with epoxy resins.

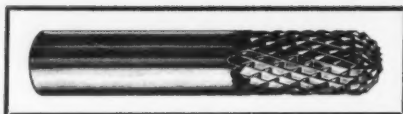
Cerro's complete line of low-melting alloys will be exhibited along with a variety of spray guns and melting equipment.

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SOLID CARBIDE END MILL

The "Master Mill" to be exhibited by The Metal Removal Co., 1801 W. Columbia Ave., Chicago 26, Ill., in Booth 1137, is a new type solid carbide



The "Master Mill" Solid Carbide End Mill

end mill for refractory metals Rockwell 50C or harder. The Master Mill, because of its tendency to counterbalance the right hand turning action of the spindle, results in a neutrally stressed tool free of any tendency to pull forward, grab, or chatter. The Master Mill's great web strength, rigidity, and efficient chip disposal result in unusual economy and efficiency. Because of its multiple number of teeth the mill retains its edge sharpness on refractory metals for a long period of time. The mills are available in sizes up to 1-inch diameter in solid carbide. All sizes are also available in ball end style.

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INSERTED BLADE TOOL

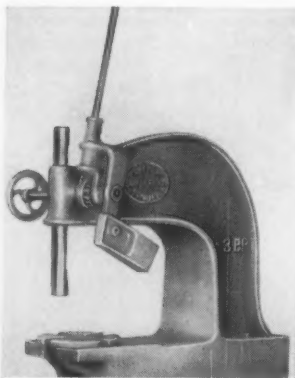
Waukesha Cutting Tools, Inc., Waukesha, Wis., will feature its complete line of inserted blade tools in Booth 3914. Its wide variety of inserted blade tools include spade drills, floating tool holders, reamers, counterbores, floating chucks, flat spades and special tools for specific requirements. Sizes now range from 1 to 5 inch diameter, and depths from 3 to 25 inches.

A line of double edge boring or coring blades will also be shown.

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View shows Waukesha Inserted Blade Tool



**G
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Use 3B (simple lever type) or 3BR (ratchet type) Presses for work up to 33" diameter. Maximum 3 Tons Pressure and 12" Daylight.

Write for Catalog M-43 or see your dealer for more specifications.

Greenard ARBOR PRESS CO

41 CROWN ST. NAGUOA, N.H.

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DIAMOND GRIT, DRESSING TOOLS AND SAW BLADES

In Booth 3310 Diamond Tool Research Co. Inc., Wholesale Div., 580 Fifth Ave., New York 36, N. Y., will exhibit the development of a new type of natural diamond grit. Full scale production of these grits, known as Pressure-Tested Diamond Grits and Micron Sized Powders is now underway. Extensive tests have been made in lapping and grinding carbides, steel, corundum and diamonds with the result that this new diamond abrasive is becoming widely known and used. These diamond structures are extremely blocky, longer lasting, smoother cutting; and because of their uniformity, closer grading is possible.

Another feature will be a series of diamond masonry and concrete saw blades of industrial diamond products. These blades are unique in that they feature both Pressure-Tested diamond

grits as well as a Tungsten Carbide Bond. The inherently superlative quality of Pressure-Tested diamond grits makes an enormous difference in the ability of these blades to take heavier cuts and cut more footage. Pressure-Tested diamonds enable the DTR blade to withstand working pressures as never before.

The use of Tungsten Carbide as a bond in DTR's diamond saw blades increases the efficiency of the blade by preventing the wearing away of the rim before the diamonds. The DTR diamond concrete saw blade embodies a special "raker" design built into the rim, which results in much faster cutting and eliminates undercuttings by removing or "raking" out the chips of concrete.

The company will also display its new NR series of "non-resettable", and expendable diamond dressing tools.

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high speed sheet polishing

Pneumatic abrasive belt tensioning. Constant through feed using CURTIS-originated conveyor belt principle. Simplified single control stock thickness adjustment — all features of the Model 150 CT. Designed to produce better finishes at higher speeds and at lower cost . . . on any flat metal surface.

For your copy—Model 150 Brochure write to: Curtis Machine Division, The Carborundum Company, Niagara Falls, N. Y.

CARBORUNDUM



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ASTME Tool Show . . .

DEBURRING DEVICE

Vernon Devices, Inc., 481 East Third St., Mt. Vernon, N. Y., will exhibit the Burr-Bit tap hole deburring device in Booth 3120. This tool, which mounts on any make tap, eliminates an operation by deburring the top of the hole during tapping operation. It is available to fit standard taps No. 2 to 1 1/4 inch, and pipe taps both straight and tapered from 1/8 to 1 inch. A new type of spring will be shown giving many advantages. The Burr-Bit can now be used with all tap chucks and holders, even those gripping all of the tap shank. Deeper tapping can now be accomplished by removing the stop collar. In addition the depth of chamfer can now be varied.

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CUT-OFF MACHINES

In Booth 3822 Beaver Pipe Tools, Inc., Dana Ave., Warren, Ohio, will exhibit its No. 20 oscillating machine which provides large cutting capacity in solids with excellent finish, and unusually fast cutting times. Solid materials can be cut at the rate of three to four seconds per square inch, resulting in savings of time and money.

NEW HONING LAP

- Laps Everything • Better Than Diamond • Will Not Load • Finer Finish • Laps everything from plastic to hardest carbides without loading! • Costs 70% less than diamond • Use wet or dry
- Four grits—180-220-360-500
- Easily resurfaced by ordinary sanding.



\$8.75 each,
any grit

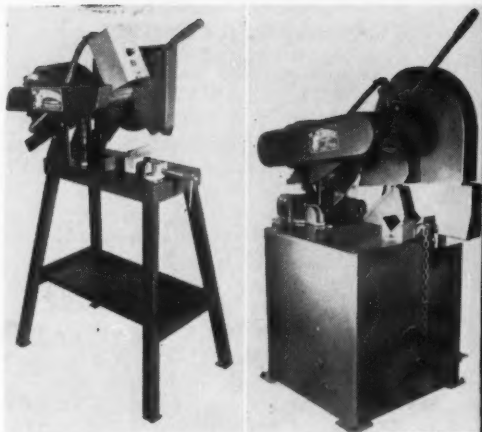
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View of (Left) Beaver Speed-Cut No. 20 Oscillating Abrasive Cut-Off Machine and (Right) No. 11 Abrasive Cut-Off Machine

The smaller No. 11 machine will cut up to 3 inch shapes and 1 1/2 inch solid materials at the rate of 3 to 4 seconds per square inch. It is almost a must for the small shop, and is used by large shops as an auxiliary tool for their miscellaneous cutting, allowing their larger equipment to be reserved for the larger work.

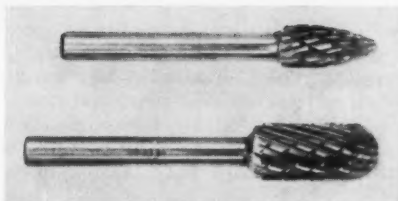
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CARBIDE BURS, DRILLS AND END MILLS

A bur cut and carbide grade, for extremely fast removal of aluminum, brass, copper and other non-ferrous metals and also for trimming plastics and wood will be exhibited by Starlite Industries, Inc., 58th and Market Sts., Philadelphia, Pa., in Booth 1725. It is highly efficient for dressing welds and snagging castings and forgings.

Also on display will be a design drill for the drilling of clean, bur-free holes without halo. Tests have indi-



Carbide Burs for Non-Ferrous Metals

cated over 10,000 holes per drill.

Another feature of the exhibit will be a carbide end mill for high alloy

steels, which is made with a special grade of carbide to withstand shock and ground to a super-finished edge with negative rake.

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LAPPING MACHINES

In Booth 1529, Spitfire Tool and Machine Co., 2931 N. Pulaski Rd., Chicago 41, Ill., will exhibit its Model No. SP-F888-3SPN 36-Inch Gyro-

"ONE HOE FOR KALABO"

Sound and color 16 mm. movie film telling what machine tools are and what they do.

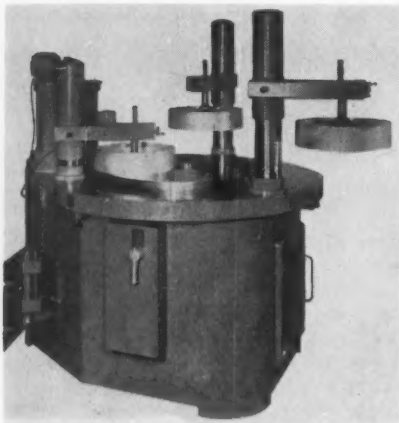
Culmination of several years of planning and production by the machine tool industry.

Designed primarily as a public education project.

Copy of film is available on free loan basis for showing to groups. Requests should be directed to Film Editor, Modern Machine Shop, 431 Main Street, Cincinnati 2, Ohio, and should specify the date of showing, the name of the organization requesting the film, the individual to whom the film should be addressed, address and telephone number.

MODERN MACHINE SHOP

ASTME Tool Show . . .



Gyro-Matic Precision Flat Lapping Machine

matic Precision Flat Lapping Machine which incorporates new design pneumatic lifts, offering industry a giant step forward in producing precise flatness and micro-inch precision in lapping and finishing piece parts on volume basis. This machine is completely without awkward holding devices or magnets. Spitfire pneumatic lifts automatically apply correct pressure for lapping a wide variety of materials.

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PRECISION INDICATING SQUARE

The Indi-Square Co., Inc., 1119 East Ridge Road, Rochester 21, N. Y., in Booth No. 3837 will exhibit its Precision Indicating Square, which eliminates time consuming effort and uncertainty of inspection and set-up for squareness. The Indi-Square instrument indicates squareness and straightness as close as 0.0001 in 16 inches. Simply position the Indi-Square to the work, raise and lower the indicating head and read the

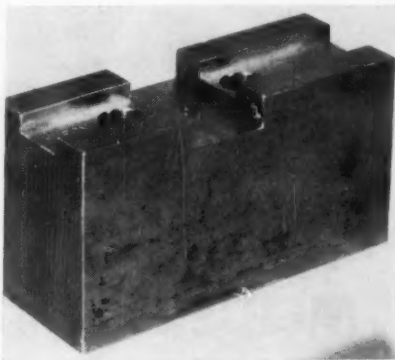
indicator. This will immediately show any error in squareness or straightness; so rapid, eliminating any guesswork or complex clamping, and so on, with the work in a released position on the surface plate. The ball recirculating indicating head travels on an extremely accurate master spline bar. The head is spring loaded to eliminate play or shake. The master bar can be adjusted from front to back and side to side in a matter of seconds. Simply position the unit to a precision granite angle plate, an accessory, and adjust. Once it is calibrated, it should not be necessary to recalibrate again unless the unit is abused. It is indispensable for tool inspection, toolroom set-up, gage making, quality control, parts inspection and set-up. It can also be used to indicate squareness and straightness in cavities, slots, and so on, that have always been serious problems. The instrument can be used with general indicating equipment or with electronic indicating devices.

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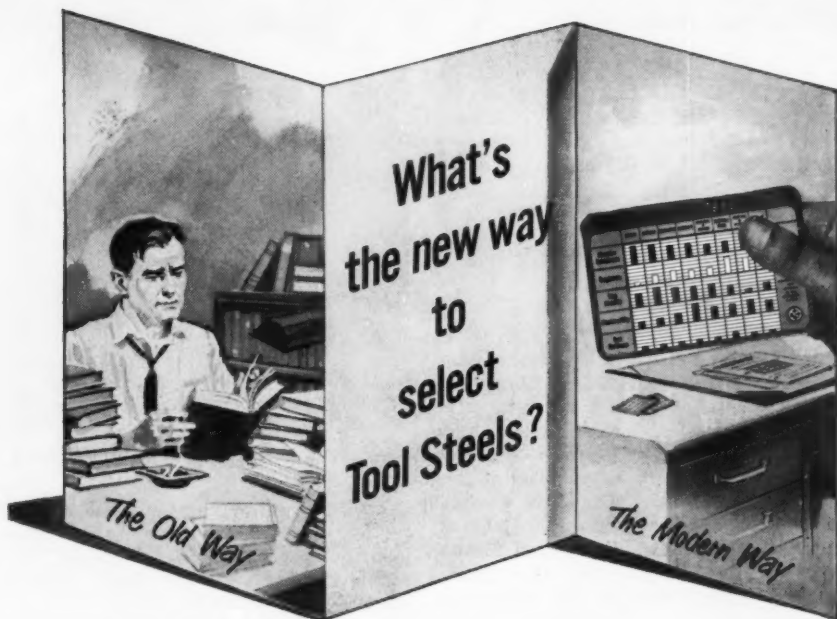
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CHUCK JAWS

In Booth 3305, Huron Machine Products, Inc., P. O. Box 2274, Dear-



Huron Soft-Blank Top Jaw for all chucks



Use the A-L Steelector System

The man on the right is using the new way. With the new Allegheny Ludlum STEELECTOR he can select tool steels virtually at a glance. Best of all, he knows that his first choice is in stock—available right when he wants it. No longer does he have to waste hours looking through handbooks and catalogs only to find that he has selected a brand that is unavailable . . . or entails expensive delays because he must wait for the mill to make it.

With the STEELECTOR, picking the proper tool steel is an easy job. All you have to do is look at the STEELECTOR Card designed for the job at hand. There are STEELECTOR Cards covering general purpose tool steel applications, hot work applications, and high speed grades. A glance at the card compares the five basic tool steel properties—abrasion resistance, toughness, size stability, machinability, and red hardness—of each of the STEELECTOR tool steel grades.

Bar graphs show how the steels compare so it's simple to check the properties most important to you and pick the grade with the combination of properties you need. The

three STEELECTOR Cards list grades that will suit 96 per cent of all tool steel applications—as shown by an actual survey of the authoritative A-L Tool Steel Handbook.

Backing up the STEELECTOR Cards are Data Stock Lists for every grade. They list the complete necessary range of sizes and shapes available and typical applications. They also include heat treating and other data to assure you that you have made the proper selection.

You can put full confidence in STEELECTOR grades because they have been selected from the complete line of A-L Tool Steels and are made under the rigid quality control standards common to all A-L products.

To take the guesswork out of tool steel selection, ask your Allegheny Ludlum sales representative for your copy of a colorful STEELECTOR Bulletin that contains all three STEELECTOR Cards, describes the tool steels, and explains the Data Stock Lists, or write: *Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pennsylvania. Address Dept. MS-5.*

STEELECTOR
PROGRAM



ALLEGHENY LUDLUM
Tool Steel warehouse stocks throughout the country



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May, 1961

MODERN MACHINE SHOP

3085

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born, Mich., will display soft-blank top jaws for all chucks with American Standard Master Jaws. Each Huron product is made of the highest quality workmanship.

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CLAMP

In Booth 2308 Siewek Tool Co., 2862 East Grand Blvd., Detroit, Mich., will exhibit the Retract-A-Clamp, a spring loaded clamp that automatically swings up and back, freeing and clearing the work piece when the locking mechanism is released. The locking mechanism for these clamps can be a hand cam, hand knob or a nut for versatility. The clamp straps used are forgings and are either cross tapped with a slot in the end or a



View shows the Siewek Retract-A-Clamp

solid strap tapped through. The slotted strap allows for pivotal tooling such as a self aligning vee-block. The solid strap allows for solid tooling adaptations.

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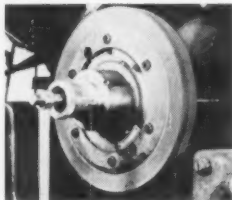
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DRILL POINTER AND TAP GRINDER

A drill pointer with an automatic hopper feed known as the Model 100-C Winslo-Matic Drill Pointer will be displayed by Winslow Product Engineering Corp., 47 St. Joseph St., Arcadia, Calif., in Booth 1240. This addition to the Winslo-Matic drill point grinder line will accommodate drill sizes from No. 80 drills to 1/2 inch diameter drills. This unit is said to be extremely fast, having a production rate up to 1500 drills per hour. The hopper feed attachment is completely automatic. Up to 500 drills can be placed in the hopper bin which is mounted above the workhead. Additional drills may be added to the hopper as required to keep production at a continuous high rate. After the grinding operation, drills are neatly

FOR QUALITY CONTROL OF TOLERANCE AND FINISH

Any grinder operator can quickly balance grinding wheels with great precision, without removing wheel from machine, with the micrometer accuracy of the B.E.C. balancing unit, weights and simple instructions.



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1928 BROADWAY FT. WAYNE, IND.

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306 MODERN MACHINE SHOP

May, 1961

Eliminate costly reading errors with the

"HELIOS"

DIAL VERNIER CALIPER with built-in DIAL INDICATOR

Direct Reading in .001"

The world famous "HELIOS" Dial Vernier Caliper is hardened, ground and lapped throughout.

Other features:

- Thumb roll permits quick and easy operation
- Knurled lock screw
- 100% measuring capacity (outside, inside and depth.)

Available in 5", 6", 8" and 10" capacities in tool steel or stainless steel.

Height Gage Attachment optional.

"HELIOS" SWING-JAW VERNIER CALIPER

with knurled lock screw

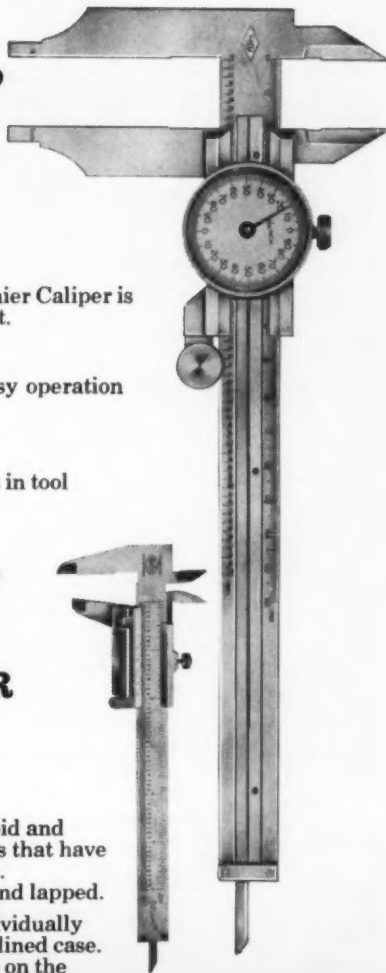
- Direct Reading
- Capacity 4 3/4"
- Length of Jaw 1 3/8"

The swinging jaw allows a very easy, rapid and extremely accurate measurement of parts that have faces which do not lie along the same axis.

This caliper is stainless steel, hardened and lapped.

Every "HELIOS" Vernier Caliper is individually packaged in a beautiful hardwood velvet-lined case.

Write for detailed information and prices on the "HELIOS" Caliper line.



M. B. I. EXPORT & IMPORT LTD.



475 Grand Concourse, Bronx 51, N. Y.

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ASTME Tool Show . . .

deposited in a tray in front of the workhead.

The Model 100-C Winslo-Matic Drill Pointer is completely automatic in all respects, even to dressing and compensating of the grinding wheel. Because of the ultra-precision point, concentric within 0.0002 inch, drills sharpened on this pointer produce extremely close-tolerance holes, eliminating most reaming operations and greatly increasing tool life.

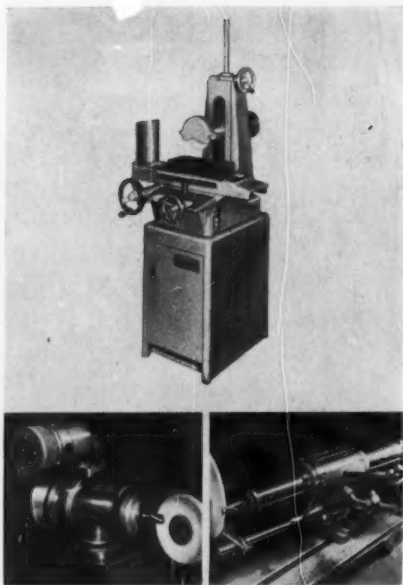
Also the latest accessory will be shown for the Model 100-A Winslo-Matic Drill Pointer. This is a new workhead for grinding chamfers on taps. An exceptionally fast grinding rate of 12 taps per minute is claimed by the manufacturer.

The angle of chamfer grind is determined by the angle formed on the grinding wheel, and the grinds follow the same ultra-precision as produced on the drills ground on the Winslo-Matic Drill Pointer. This high degree of precision enables the user to produce tapped holes to Class 5 precision. For more data circle 176 on Postpaid Card

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SURFACE GRINDER, GRINDING FIXTURE, DIES AND VISES

Shown in the accompanying illustration are three of the newest machine



(Top) Harig 612 Surface Grinding Machine; (Bottom Left) Harig Relief and Drill Point Grinder, (Bottom Right) Harig Air-Flo Fixture

tools to be featured by Harig Mfg. Co., 5765 West Howard St., Chicago 48, Ill., in Booth 1514.

Other items on display in Harig's booth will include carbide and steel dies, vises and also the Harig Grind-All Fixture for precision grinding of perforators.

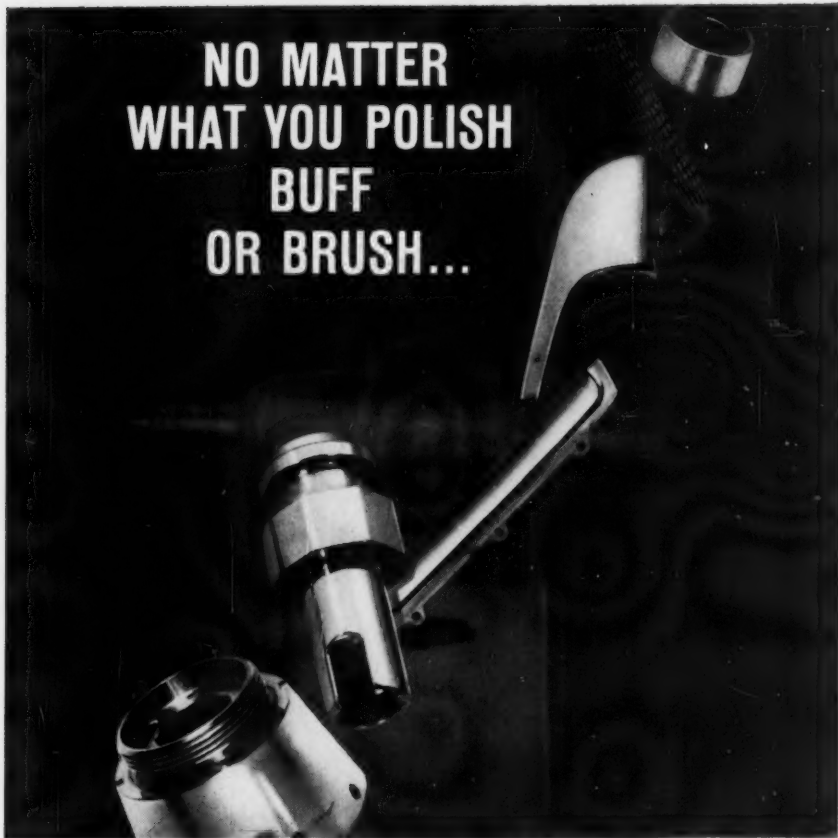
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For Your Convenience...

the "Where to Get It" section of MODERN MACHINE SHOP provides a quick reference to machinery, tools and supplies advertised in the current issue. Use it consistently. You'll find it's very helpful. (See pages 310, 312, 314, and 316.)

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431 MAIN STREET • CINCINNATI 2, OHIO

NO MATTER WHAT YOU POLISH BUFF OR BRUSH...



NEW OSBORN POLISHING/BUFFING LATHES . . . these compact, variable speed lathes are Osborn-engineered to handle your work economically at highest efficiency. Available with balanced single or double spindles, fixed or variable speed ranges from 600 to 3600 rpm. Variable speed lathes have 3-to-1 speed range. Choice of 3, 5 or 7½ hp motors. Other features include: motor-mounted magnetic disc brakes for instantaneous spindle stopping. Roto-Cone drive for instant, vibration-free power transmission and speed changes. *The Osborn Manufacturing Company, Dept. B-34, Cleveland 14, Ohio. Phone ENdicott 1-1900.*



FREE BULLETIN 620 includes complete specifications, operating and construction details plus application data. Write for your copy.



Booth 2407

**Metal Finishing Machines
... and Finishing Methods
Industrial Brushes**

Foundry Production Machinery

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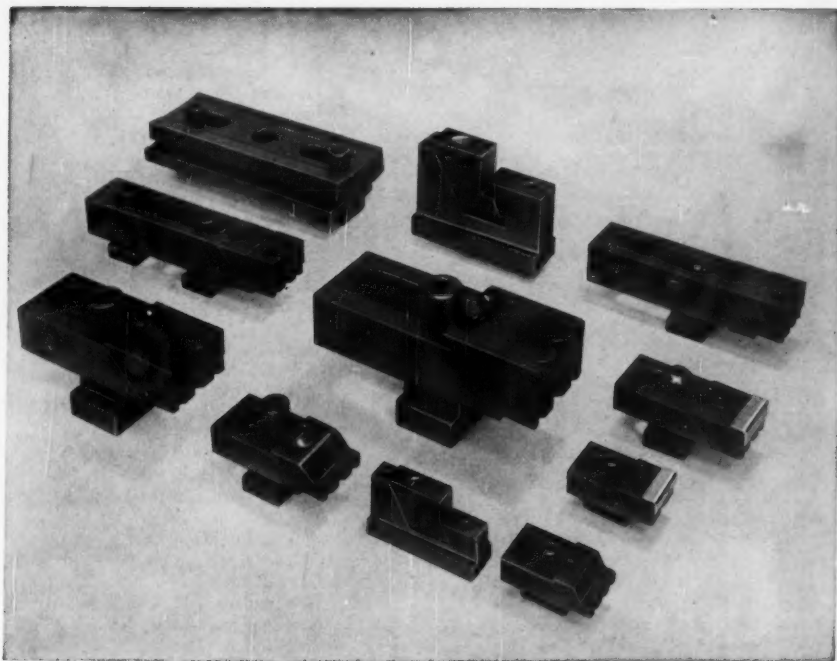
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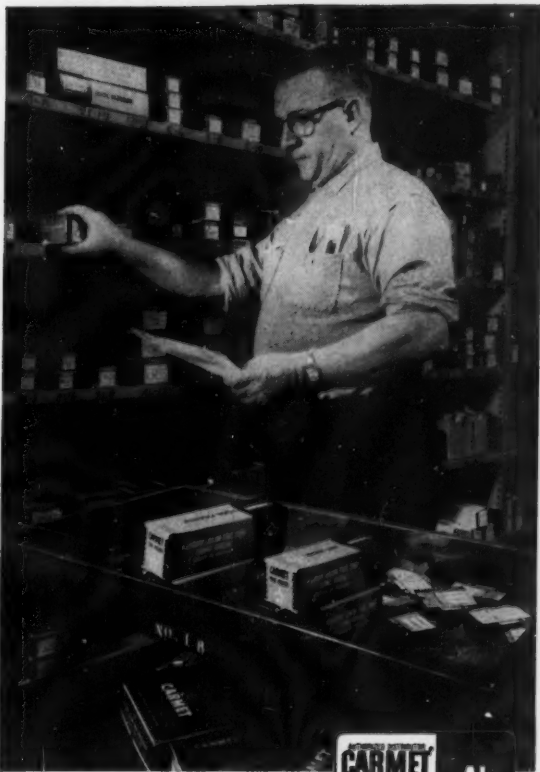
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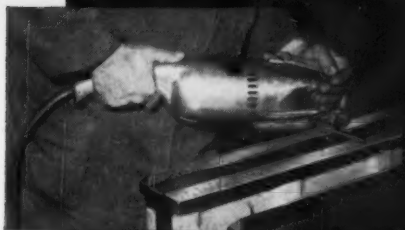
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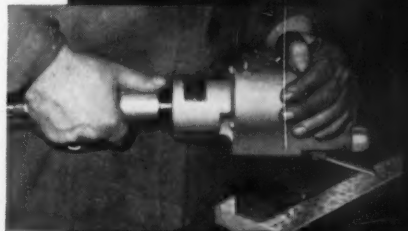
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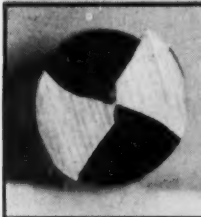


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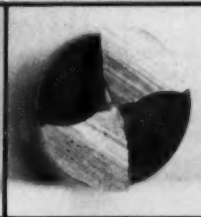
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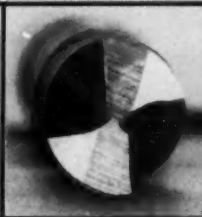
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LELAND-GIFFORD'S new DrillPointMaster will sharpen, relieve and thin any drill from #80 to .250" diameter ... lets you produce the ideal point geometry for any drilling job — then duplicate that point precisely time after time.

Check the many exclusive features listed at the right, then add these extra benefits:

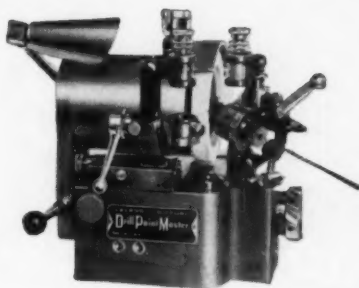
Removes only .003" to .005" in renewing point. Normal practice requires .030" or more, wasting up to 90% of useful length.

Grinds at right angles to cutting edge. Conventional grinders leave grit marks parallel to lip which quickly break down, dull the tool, generate excessive heat.

Drills are centered and located by means of precision collet chuck and microscope viewers. All other methods perpetuate errors resulting from lip wear or inaccuracies in the drill.

Will grind *left hand drills* and, with a diamond wheel, does an excellent job on *carbide drills*.

Get the whole story on the Leland-Gifford DrillPointMaster. Write, wire or phone for an in-plant demonstration — or for complete information.



FEATURES

- Point angle adjustment set from 60° to 130° included angle.
- Lip relief adjustment from 0° to 26°.
- Wheel slide and point thinning carrier micrometer adjusted.
- One collet chuck serves both sharpening and thinning positions.
- Only a few collets needed for all drill sizes.
- Special sandwich wheel for clean, dry grinding and thinning without burning.
- Two variable power microscope viewers plus sealed beam light for precise setting and inspection.



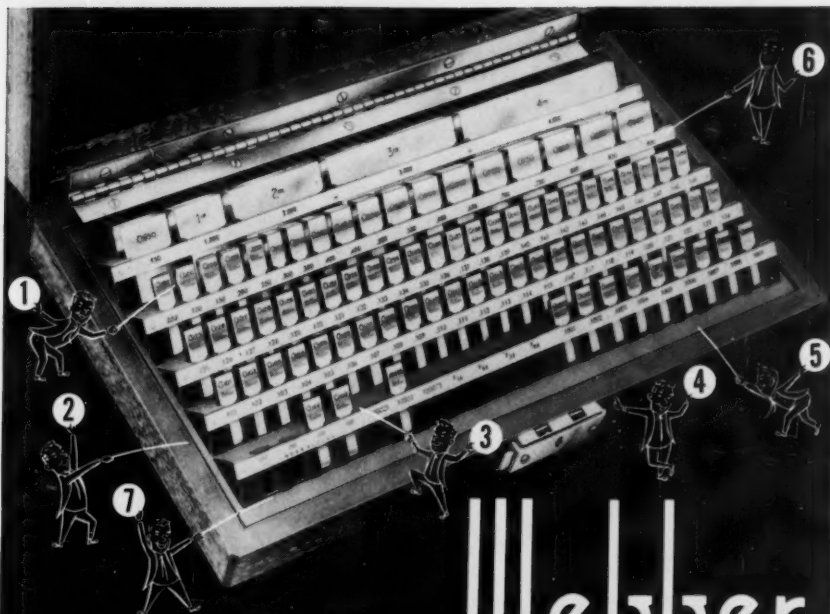
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WORCESTER 1, MASSACHUSETTS

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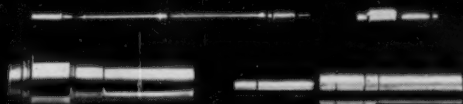
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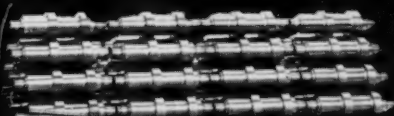
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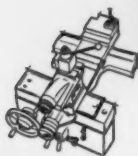


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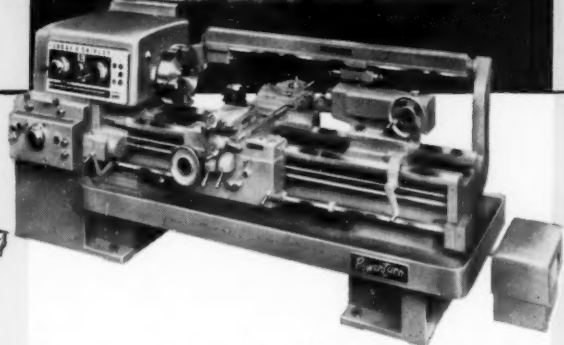
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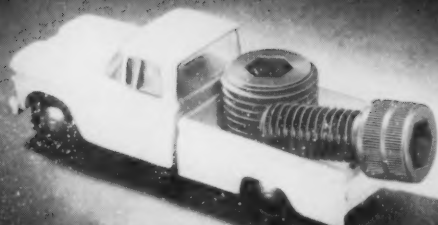
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